

FLIGHT

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AIRCRAFT ENGINEER
AND AIRSHIPS

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Founder and Editor: STANLEY SPOONER

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EDITORIAL COMMENT



It is undoubtedly a good thing to hold air exercises at least once a year. In a way they resemble the test flights of an aeroplane. Air Defence of Great Britain is in fact a machine, somewhat an elaborate machine, which is being slowly constructed. Year by year it is gradually improved in the drawing office, and the improvements need periodical testing. This machine is based very largely on human parts, and human factors are harder to calculate than are mechanical parts. The personnel of the parts is constantly changing. It was only in September of last year that Air-Marshal Sir Geoffrey Salmond assumed command of Air Defence of Great Britain, and his Area Commanders, Air Vice-Marshals Bowhill and Sir Tom Webb-Bowen, only took over in May and September respectively of last year. All three will naturally want to see their commands in action. In the ordinary course of events the personnel of the bomber and fighter squadrons is constantly changing, and the air exercises are the test which shows how the new officers and men have settled down into their organisations.

Probably the most incalculable factor, and certainly not the least important, is the human element in the Observer Corps. These special constables are volunteers who serve their country for sheer patriotism, and we honour them for it. Again, it is only natural that members must resign at times, and new ones be enrolled. This corps is, it is not too much to say, the keystone of the whole structure. It is very necessary to see, at least once a year, how the Observer Corps is functioning. Moreover, the best way to stimulate keenness among the members of the corps is to employ them. No extraneous attractions are offered to them. They wear no splendid uniform. Their duty is to go out, regardless of weather, to some chosen spot in the country, and look and listen for the passing of raiders. Their reward comes when they are prompt to spot a raid and report it, and

DIARY OF CURRENT AND FORTHCOMING EVENTS

(Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—)

- July 22-31. International Air Meeting, Zurich.
- July 23. Northants Ae.C. Meeting at Kineton.
- July 23-24. Deauville Air Meeting.
- July 23-24. York County Aviation Club "At Home," Sherburn-in-Elmet.
- July 24. Brooklands "At Home."
- July 24. Stage and Screen Ae.C. Inaugural "At Home," Hatfield Aerodrome.
- July 30-31. Skegness Air Pageant.
- July 31. Comrades of the R.A.F. (Hounslow, Heston and Dis. Branch), Garden Party, Hanworth.
- Aug. 1. Motor Rally and Flying Gymkhana, Armthorpe Aerodrome, Doncaster.
- Aug. 6. Newcastle Air Meeting, Cramlington.
- Aug. 6. London-Newcastle Air Race.
- Aug. Cramlington Air Race.
- Aug. 6-7-8. International Air Meeting, Le Zoute, Belgium.
- Aug. 11-28. International Touring Competition, Berlin.
- Aug. 15-16. Cricket: R.N. v. R.A.F. at Lords.
- Aug. 19-21. 4th Annual Canadian Air Pageant, St. Hubert, Quebec.
- Aug. 20. Ryde Air Pageant.
- Aug. 25. Folkestone Ae.C. Trophy Race.
- Sept. 3. Leicester Chamber of Commerce Day, at Desford.
- Sept. 4. Divine Service at Ratcliffe Aerodrome, 2.30 p.m.
- Sept. 5. F.A.I. Conference at The Hague.
- Sept. 8. International Meeting, Vicenza, Italy.
- Sept. 24. Air Display at Hillmans' Aerodrome, Gallows Corner, Brentwood.
- Sept. 25. Gordon Bennett Ballon Race, Basle.
- Oct. 1. Bristol and Wessex Ae.C. Garden Party.
- Oct. 18. Aero Golfing Society: Cellon Challenge Cup, West Hill G.C.
- Nov. 18-Dec. 4. Paris Aero Show.

afterwards they may learn that it was their report which sent up such and such a fighter squadron to deal with the miscreants as they deserved. Like all good volunteers, the best way to make them keen, and to keep them keen, is to use them; and to let them know that their services are of real value to their country. For the sake of the Observer Corps alone it is well to hold air exercises once a year.

The exercises this year are different from those of previous years. They are tactical rather than strategic. There will be no attack on London or any other large town. There will be no air war waged, as in 1930, between the commanders of Blueland and Redland. Raids will take place on a number of points, each in the country, and each marked with a camera obscura. The fighting will be more unreal than usual, because no searchlights and no anti-aircraft guns are employed. These guns and these searchlights belong, as we have remarked more than once with disapprobation, to the Territorial Army, and in these exercises no units of other Services are being employed. In fact no representatives of the other Services and no foreign attachés are being invited to attend the exercises. They are, as we remarked before, purely tests to see how certain parts of the machine are working, and literally to exercise those parts.

In previous years the scheme of an attack on London attracted much attention. Both British citizens and foreign observers paid a great deal of attention to the exercises, and nearly everyone tried to draw some conclusions from them. The conclusion most commonly drawn was that London was indefensible from air attack; but it can be argued that this was an unwarrantable conclusion to draw from the happenings. They did go to show that British day bombers were very formidable, and they are now more formidable still. They did emphasise the need for fighters of greatly improved performance; and these have largely been provided. They suggested (though here absolute proof was not possible) that though it might be possible for a certain number of enemy raiders to get over London, their casualties would be so heavy that repetition of the raids would soon become impossible. They probably showed up some strong points and some weak points in our system of communications. They induced pacifists to yell that we must cut down our Air Force. They certainly gave many people the totally erroneous impression that our Air Force was being trained to bomb all and sundry without regard to the military value of the place where they dropped their bombs. This last result was certainly unfortunate; though perhaps it had some effect in inducing the Disarmament Conference to consider how best the civil population may be protected from the appalling horrors of unrestricted air warfare.

No such conclusions are to be drawn from the present exercises. Neither Northland nor Southland will win this war. The Area Commanders will not be given a free hand; and the Commander-in-Chief will, if he thinks fit, alter the conditions while the exercises are in progress so as to ensure that they test and practise the points in the machine which he considers most need test and practice.

One point in the disposition of the defence forces, which has been published, interests us not a little. All the three interceptor squadrons have been tem-

porarily withdrawn from the coast aerodromes of Tangmere and Hawkinge, and are stationed further inland. No. 1 (Fighter) Squadron is at Northolt, No. 25 F.S. at Kenley, and No. 43 F.S. at Upper Heyford. In the exercises last year No. 43 F.S., the only squadron then equipped with the "Fury," remained at its home station of Tangmere. The result was that the "Harts" came in high over its head and were far inland before the reports could go up to Fighting Headquarters and orders come down for No. 43 to take off. Even if the squadron saw the raiders for itself and was prepared to take off on its own initiative, it was still too late for even "Furies" to have a chance of catching up with the "Harts." Now that the three interceptor squadrons are stationed inland, a chance will be given to make full use of the great speed and climb of the "Fury," and the early reports of the raids show that good use is being made of this opportunity. The results of the fighting, as assessed by the umpires, are of very little significance, but that raids should be intercepted is certainly a matter of importance.



Representatives of the Government have now stated openly in Parliament that it is not proposed to continue the air route down the Persian shore of the gulf of that name after October 1. Thereafter

The Persian Gulf Route!

Imperial Airways will fly down the Arabian shore. It is to be a landplane service, and the Handley Page 42 type machines will be used. It is estimated that the capital cost of the transfer of equipment from the Persian to the Arabian coast will be about £9,750, and already the Political Resident in the Persian Gulf is negotiating with the Trucial Chiefs about the establishment of an aerodrome on their part of the coast. The reason for the change given in the House of Commons by the Government is that a detailed examination of the whole question has shown that "the Arabian route possesses certain important practical advantages."

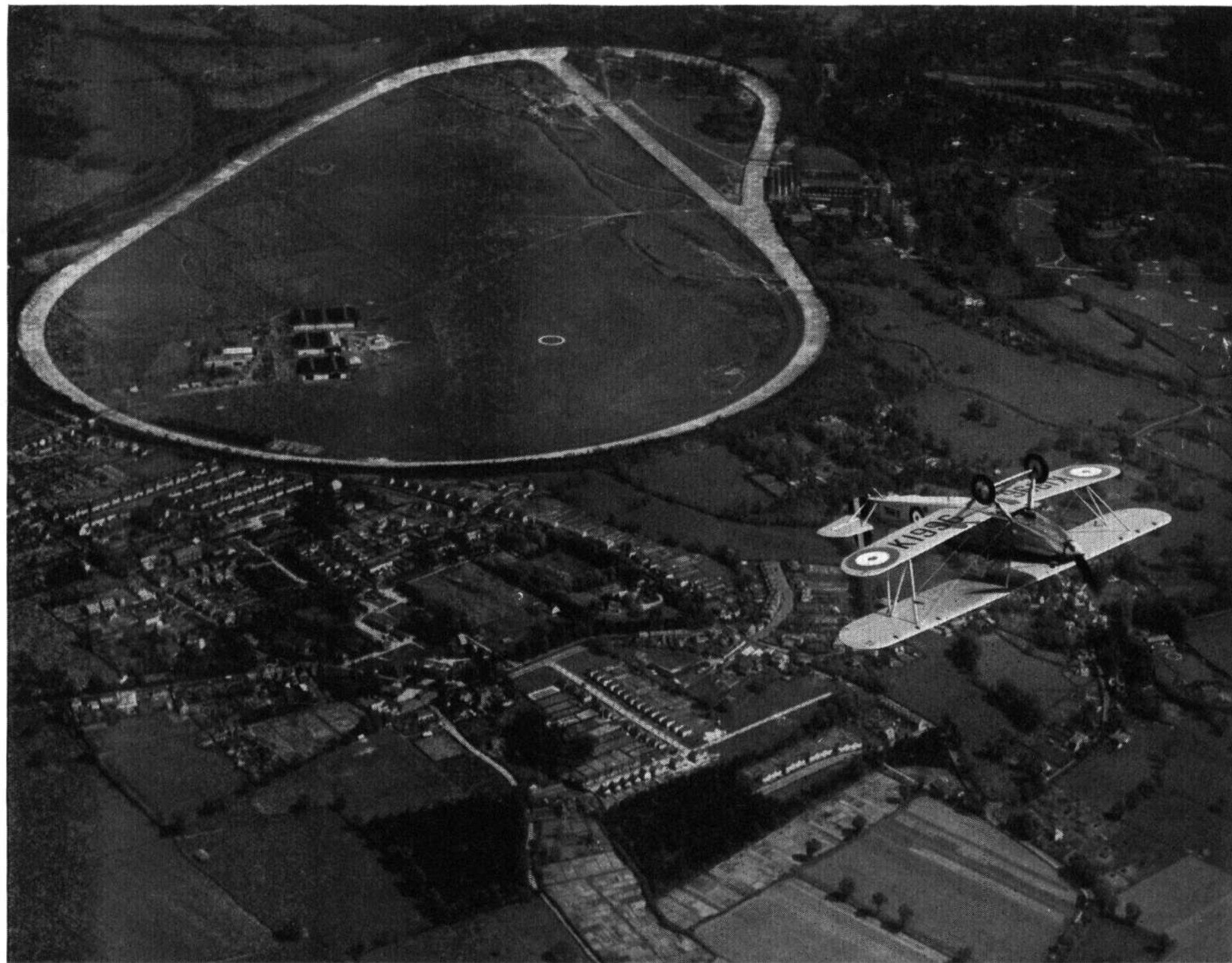
We can well believe that it does so, though the route is actually longer than the present one along the shores of Persia. The Arabian shore of the gulf is very much under British influence, whereas Persia is a foreign nation which is able to forbid or permit the use of aerodromes in its country by British aircraft as seems good to it. For the second time in the history of the India air mail service, this dependence on the will of a foreign Power has caused us inconvenience, and it is good time that we finished with that business. The time is not yet in sight when civil flying will be international and all civil aircraft will be able to land where they like without a by-your-leave. For the present, we of the British Empire must plan our air routes to serve our own needs, and must depend as little as possible on the goodwill of foreign nations. We have already learnt the lesson that lack of that goodwill may interrupt our communications in time of peace. In time of war the situation might well be much more serious.

To FLIGHT it is a matter of regret that the change over to the new route does not mean a change to the use of flying boats. They would have been able to shorten the mileage, by cutting across the great bay from the Qatar peninsula to the straits of Ormuz.

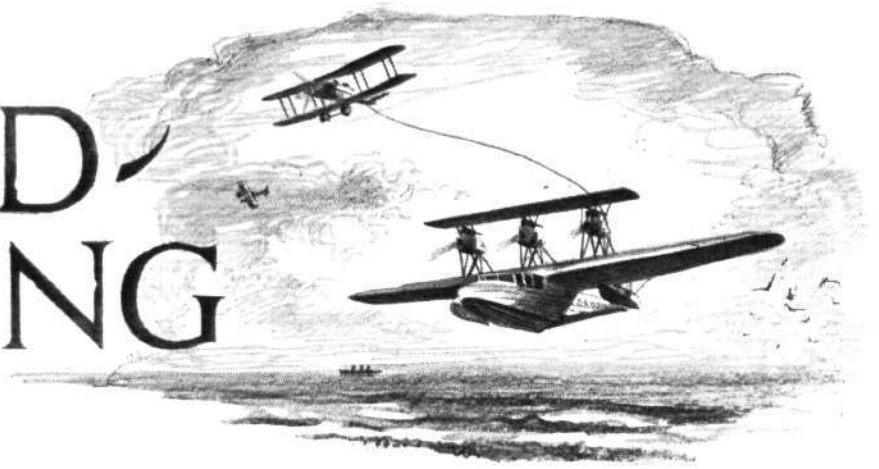
TURNING HER BACK ON
HOME:

A HAWKER "HART" (ROLLS ROYCE) "KESTREL" DOING INVERTED FLYING (PILOT MR. SAYER) NEAR BROOKLANDS. THE WHOLE OF THE "BOWL" CAN BE SEEN IN THE PICTURE, WITH THE HANGARS, CLUB HOUSE, MEMBERS' ENCLOSURE, TEST HILL, ETC. ON THE EXTREME RIGHT, AT THE "FORK," MAY BE SEEN THE HOME OF VICKERS, LTD. IT IS RARELY THAT ENGLISH WEATHER PERMITS OF TAKING PICTURES FROM SUCH A HEIGHT.

(FLIGHT Photo.)



WIND HOVERING

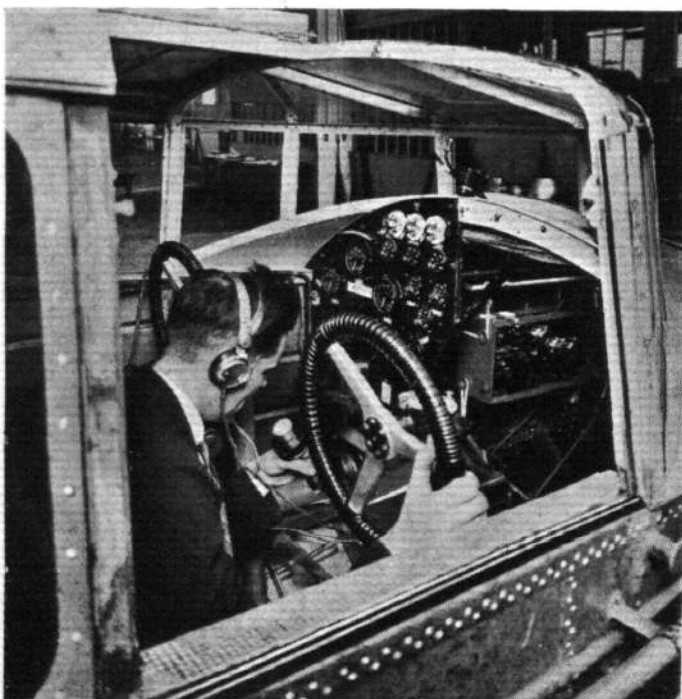


Mrs. Victor Bruce takes off from the Solent on Friday, July 22, on an attempt to stay in the air over a month. She will be flying a Saro "Windhover" (three Gipsy II engines).

ACCORDING to her plan Mrs. Victor Bruce will start her record-breaking endurance flight from the Solent to-day, Friday, July 22. As our readers know, she is flying a Saunders-Roe "Windhover" with three Gipsy II engines. In FLIGHT for June 10 we gave some preliminary details of the lengths to which Mrs. Victor Bruce had gone in organising this attempt, and if it fails it will certainly not be due to a breakdown of that organisation. Nothing which has been suggested to further the satisfactory outcome of the attempt has been disregarded and every detail has, not only been thought out most carefully, but its operation has been practised assiduously until everyone concerned has proved "word perfect." The "Windhover" has been fitted to carry 234 gall. of fuel, distributed in three tanks, one of 75 gall. in the wing and two of 75 and 84 gall. each in the fuselage. Although it is not expected that the engine fuel pumps will give the slightest trouble, yet this contingency has been anticipated by the installation of both a hand pump and a wind-driven pump. Careful precaution is evident throughout the whole machine and every provision has been made to replace such essential features as sparking plugs, contact breakers, etc., on the

engines, should such replacements be necessary. The general design of the "Windhover" has made precautions like this possible, for with its engines mounted on the wing it has been found possible for a member of the crew to climb up a prepared catwalk by means of a special safety belt having two wires with snap hoops at their ends so that these wires may be hooked on to a convenient point, thereby ensuring that should the wearer slip he will not fall overboard. In the event of any work on the engines being necessary, this will be undertaken by F/O. J. B. W. Pugh, who is accompanying the Hon. Mrs. Victor Bruce and her husband during the attempt.

Owing to the load carried, it has been found impossible to retain the amphibian gear, and the boat is therefore only able to land on the water, and her route during the four weeks in the air will naturally be dependent upon landing conditions being suitable; she will probably be visiting several coast towns, including Southsea, on many occasions. Forced landings, therefore, will not trouble the crew to the extent they would have done over land, but, nevertheless, jettison valves have been fitted to the fuel tanks which will enable the total contents to be dumped in under 1 min. should it be desirable to lighten the boat.



Marconi light-weight telephone equipment, Type A.D. 22B, fitted in Mrs. Victor Bruce's "Windhover."



The Marconi A.D. 18A equipment in the Morris 10 cwt. The long-wave receiver is on the left and the transmitter and short-wave receiver on the right.

The refuelling arrangements will now be in the hands of Messrs. Sparks, McClery and Watson who will between them operate the two Bristol Fighters fitted for the purpose. The scheme which has been tried successfully is for the two Fighters to fly in line abreast with a cord between them. On this cord is a large curtain ring with a rope tail some two or three yards long. The "Windhover" will be flown directly at this tail and Mrs. Victor Bruce will herself, from the bow cockpit, catch the tail and thus eventually the cord between the two Bristol Fighters. This cord will then be cut and that to the left-hand machine will be attached to an endless pulley on the side of the "Windhover"; then when the "Windhover" has risen slightly, and the Bristol Fighter gone down a little, the cord will be wound aft by the endless pulley where Mr. Victor Bruce in the rear cockpit will haul it in and secure the refuelling pipe from the Bristol Fighter which by this time will have taken up station over the "Windhover." This refuelling operation will in all probability be carried out morning and afternoon, but of course this programme may be varied according to the weather conditions. The fuel being used is "Regent" spirit and this will be exactly the same No. 1 as can be obtained from any roadside pump. Supplies of Vacuum lubricating oil as well as those of food, newspapers, mails and other necessities will be lowered directly to the "Windhover" in special bags from one of the Fighters. The ground organisation remains essentially as was previously described, and this will be the charge of F/O. J. H. Lock. Both his van and also the "Windhover" have been fitted with appropriate wireless sets by the Marconi Wireless Telegraph Co., Ltd., and, as

will be seen from our photographs, these installations are extremely compact. The Junior Aero Club recently gave a Dinner to Mrs. Victor Bruce and her crew at which Mrs. MacAlery presided. Each member of the crew was prevailed upon to say a few words, but being essentially people who do things their speeches were commendably brief. Mrs. Victor Bruce, in returning thanks for the reception they had received, said that the existing American record was 23 days, and this was the figure they would set out to beat when they took off from the Clarence Pier at Southsea on Friday. Although little claim has been made that a flight like this will be of any definite value to aviation, there is no gainsaying the fact that if Mrs. Victor Bruce proves the possibility of refuelling regularly, twice a day every day for four weeks in our English climate, and also that three engines can adequately be serviced in the air without the necessity of landing on any occasion, she will have paved the way in no small measure towards the time when the idea of machines being flown long distances and refuelled in the air while on ordinary commercial work will seem a natural thing. This point of view was very ably brought out by Mr. Oswald Short, who averred that if Mrs. Bruce succeeds she will have done something very valuable for British aviation.

These dinners at the Junior Aero Club are now becoming well known as a mark of appreciation which is paid to everyone who does something worthy of note in aviation, and the Hon. Victor and Mrs. Bruce, together with the other members of the "Windhover" crew, may consider themselves honoured in that they were dined before the successful completion of their flight.

PRIVATE FLYING & GLIDING

NEWCASTLE-UPON-TYNE

As mentioned last week in *FLIGHT*, the London-Newcastle air race will be run from Brooklands to Cramlington on Saturday, August 6. There will also be a flying meeting at Cramlington in connection with the finish of this race on the same day. The local race, of which all details were also given last week, will be run towards the end of the meeting, so that there will be time for the competitors in the major race to take part should they wish to do so. During the meeting several other competitive events will be held which will, it is hoped, attract a large number of visiting pilots.

NORFOLK AND NORWICH

The generous President of the Norfolk and Norwich Aero Club, Mr. H. N. Holmes, recently made it possible for three of the old club machines to be exchanged for newer types, these being a "Cirrus Moth" and two "Gipsy Moths." By way of showing the club's appreciation to the President, Col. F. C. Shelmerdine, Director of Civil Aviation, was invited to Norwich to accept the

machines officially, on behalf of the club. Col. Shelmerdine arrived by "Puss Moth" from Heston on Saturday, July 16, where he was met by the Chairman, Capt. A. A. Rice; the President; the Lord Mayor, Sir G. E. White, and the Sheriff, Mr. Herbert Fraser. Three pilots, Messrs. Gowing, Kirkby and Collier then flew past in the three new machines. After tea in the new club enclosure the Chairman expressed a vote of thanks to the President and welcomed Col. Shelmerdine, who, in reply, expressed the appreciation of the Air Ministry and of the club for Mr. Holmes' generosity. The Lord Mayor also thanked the donor on behalf of the City of Norwich. Before he returned to London, Col. Shelmerdine was shown round the club premises and later inspected the work which has so far been done on the new Boulton & Paul "Mail Carrier," illustrated on page 678.

MAYLANDS AERODROME

It has been pointed out to us that Mr. Hillman, of Hillman's Motor Coaches, operates his Air Taxi service and joyriding concern at Maylands Aerodrome and not at



The first student members of the College of Aeronautical Engineering Aero Club with their "Moth" (Gipsy I) aeroplane. This Club is organised and run entirely by students of the College, who are training as ground engineers, and is a serious effort by future members of the civil aviation industry to learn everything there is to know about their job. Capt. Duncan Davis and Mr. Lowdell, of Brooklands Aviation, Ltd., are in the centre of the group, by the nose of the "Moth."

Gallows Corner. It is by the former name which the company wishes the aerodrome to be known.

BROOKLANDS

As the majority of the pupils at Brooklands are of the type who wish to take their ticket quickly and to gain experience with a view to making aviation their life's work, it is not surprising that the break in the fine weather last week did little to lower the amount of flying done. There was some excitement on Monday when the pilot of a large night bomber apparently had some difficulty in closing the throttle of one engine after the machine had landed. There was much consternation when it was seen that "The Shop" was in danger of being demolished, and evidently the "shop-keepers" thought so as well, for they beat a hasty retreat. Luckily, however, serious casualty was averted, only the wing tip brushing the building and knocking over an umbrella and two folding chairs! The "shop-keepers" themselves apparently enjoyed the occurrence, and no doubt the publicity thus given them will lead to greatly increased trade. On Sunday next, July 24, three unusual flying competitions will be held, which are the outcome of a desire on the part of the directors of Brooklands to provide something "a little different" in the way of flying. On this "At Home" day entrants will be asked to take off in their ordinary manner, climb to 1,500 ft., glide in and land over a tape on the aerodrome without actually switching off their engines. Both the take-off and the approach will be adjudged as regards careful and accurate flying, and two prizes will be awarded. The competition, for which no entrance fee will be charged, is open only to private owners with less than 150 hours' solo flying experience. Entrants are asked to bring their log books so that this experience may be verified.

On the same day a very interesting competition will be held in which a "Klemm," an "Autogiro," a Comper "Swift," and a "Redwing" will take part. This will take the form of proving which machine has the quickest take-off, the quickest climb and the slowest glide. A party from the British Medical Association will be visiting the aerodrome on that day, and it is also hoped that some of the first entrants of the blind flying competition described in FLIGHT for July 15 will be given their trials.

LIVERPOOL AND DISTRICT AERO CLUB

June was a record month at Hooton, and 354 flying hours were achieved. This compares excellently with the 248 of the same month last year. It is unfortunate that the hitherto clean record of the club has been spoilt by the conviction of a member for "flying dangerously low." This would appear an opportune moment to remind members that uninvited low flying over other persons' property can never be anything but a gross breach of manners. Low flying, even by request, invariably involves the disturbance of neighbours whose views on the subject may not have been obtained, and the club officials have no option but to co-operate with the police, and the public, in the suppression of nuisances committed by club members in club aircraft. On July 5 a party from the staff of Alfred Holt & Co. enjoyed a pleasant evening in the air followed by a supper in the club-house. Members are asked to call the attention of their friends, especially those who are doctors or solicitors, to the immense saving of time to be achieved by flying to places in North Wales and Anglesey. Colwyn Bay, for example, is only about 24 min. distant, while Holyhead may be reached in under an hour. The club "Puss Moth" is always available for hire work of this nature.

CINQUE PORTS FLYING CLUB

Over ten new members were enrolled at Lympne during the past week, and Messrs. Oetzmann and Dobson made their first solo flights. The club is now busy organising the Folkestone Aero Trophy Race on behalf of the Folkestone Regatta Committee. This trophy will be raced for annually, and in addition there are substantial money prizes for the winners, namely, £50 first and £25 and £10 for second and third, respectively. The race will take place on August 25 over a course about 32 miles long planned so that the machines will be in sight throughout. The closing date for entry fees (£2 2s.) is August 13, with late entrants at double fees up to August 20. Entry forms and copies of the rules may be obtained from the Manager, Cinque Ports Flying Club, Lympne Airport, Kent. The race is open to light aircraft of any nationality of unladen weight not exceeding 1,500 lb.

HANWORTH

Although the visibility has been bad on most days during the past week, flying activity has not been so restricted as was feared. On Wednesday quite a considerable amount of night flying was carried out. On Friday Mr. Mayers and Mr. McMullen completed their tests for the "A" pilots' licence, the latter on an "Autogiro." This is particularly interesting, as Mr. McMullen is in his 68th year. He had some preliminary training on orthodox aircraft at Hanworth and has now purchased an "Autogiro," G-ABUC, for his own private use.

Lord Cardigan's "Moth" (Gipsy I), G-AALG, which has been in use as a seaplane in the East, has now been completely overhauled after having been allowed to fall into the hold of a steamer on its trip home. Repainted in cream and blue it looks a very smart machine indeed. There is no doubt that a really good finish to any aircraft enhances its value quite considerably, and among other machines which have come out of the Hanworth workshops is the Guards' Club "Moth" mentioned in the Heston Notes of last week.

READING

The Phillips & Powis School of Flying, which has attracted so many pupils from abroad, expects to send Mr. E. S. Godiwala, of Poona, solo this week. Mr. Godiwala, besides taking his "A" licence, is also studying ground engineering in the workshops, and hopes to get his "B" licence at the school in due course. Mr. G. Kurien, another Indian pupil, went solo last week and duly completed all the tests for his "A" pilot's licence. The Sales Department has been doing very well lately, and amongst other machines, has sold the special King's Cup "Moth" flown by Capt. H. Broad to Miss Amy Johnson; a "Cirrus Moth" to Mr. G. Turnbull, and a "Gipsy Moth" to Mr. Atkey. From Monday to Thursday during this current week the aerodrome has been lighted for the use of the Royal Air Force, and the opportunity has been taken to carry on night flying from 9.30 p.m. onwards. Both night flying and also instrument flying are proving to be of increasing popularity with those pilots who realise the value of being able to fly under any conditions. The school "Moth" fitted for instrument flying is G-AALT, which will be remembered as being one of the demonstrators used all over the country by Capt. Broad the year before last. This machine now has a Reid & Sigrist Turn Indicator and a Pitch Indicator in each cockpit with a canvas hood over the rear cockpit. This hood was designed at Reading and is really very pleasant to fly under. It is transparent enough to admit sufficient light for reading the instruments by and at the same time does not give pupils the sense of being too completely boxed in. It also has the added advantage that it may be released by the instructor as well as by the pupil should this be necessary.

GATWICK AERODROME

The accessibility of an aerodrome, particularly when situated reasonably close to a large city such as London, is of paramount importance, and we have often heard much adverse criticism levelled at the aerodromes close to London for lacking in this respect. Gatwick, however, can claim to be very accessible. The Southern Railway line has now been electrified to Horley and Three Bridges, and trains run every 30 min. from Victoria or London Bridge, the journey taking 50 min. or 40 min. respectively. The Surrey Aero Club's car will meet any train if notification is given by telephone (Crawley 321), and the journey, for which a nominal charge of 6d. is made, is only 5 min. from Horley. The aerodrome is also particularly easy to find from the air, as the main London-Brighton line runs down the eastern side, while the Gatwick racecourse is on the northern end.

SKEGNESS

At the Pageant being held on July 31 the Skegness Aero Club are organising a short-distance race and a long-distance race, both of which will be handicaps, the former around a course of about 30 miles and the latter to Nottingham and back. There will also be an altitude race wherein the competitors will be required to fly to a certain height and descend again, their time being taken from taking-off to coming to a standstill on the ground. The pageant will be preceded by a supper dance on the aerodrome on Saturday, July 30, at 8.30 p.m. This dance is informal and ordinary morning dress should be worn.

THE NEW HELIUM-GAS "BELT" IN FRANCE

HELIUM, almost as rare in the field of gases as radium is in the field of metals, means a great deal to some and very little to others. To Dr. Eckener, of *Graf Zeppelin* fame, it stands for more successful voyages by airships than is otherwise possible. Its discovery in France, and on what is said to be a vast scale, thus opens an unexpected future in Europe for airship navigation. The question has therefore arisen the past few days, will European nations now go in for the lighter-than-air machines as a part of the commercial and military phases of aerial navigation?

France, at least, with apparently inexhaustible supplies of helium gas within its own borders, may now be tempted to enter into competition, with Germany and the United States, for first place in the world of airships, as distinguished from the world of aeroplanes. Will England, Italy, Germany and other European countries be able to buy this gas from France? Upon the answer to that hangs the development of the airship in those countries, unless they should happen also to discover supplies of their own.

Helium, being the ideal gas for the inflation of an airship's envelope, has been recognised as the most indispensable thing to ensure its safety and success. There is a possibility that, had this gas been used in the operation of the R.101, it might not have come to grief as it did, and at the same time the R.100 might not have been passed over to the wreckers.

An Advocate of the "Open Mind"

In France there is undisguised rejoicing. Should the 400-mile belt said to have been located by Dr. Pierre Charmont, a French hydrologist, while boring for artesian wells, turn out to be as rich in helium as now supposed, Germany may have a new rival in the lighter-than-air machine, which so far has found its principal home beyond the Rhine. That is why there is reason to believe that the French Government may not allow the export of this gas, provided it is obtainable in large commercial quantities. Such a decision would rule it out for use in England as well, if some day we returned to the construction of these big balloons.

There is always, however, a possibility that helium gas may be found in this island. Some lucky English engineer may come across it by accident, while sinking a well in Wales, Yorkshire, or elsewhere, as happened in the case of Dr. Charmont, whose "belt" is reported to run from the Mediterranean to the Vosges Mountains. Would our authorities in that event revise their views, and embark again on airship construction?

Prof. J. A. McLennan, the greatest authority on helium, entertains the idea that this country should have an open mind with regard to the practicability of the helium-filled airship. While on the staff of McGill University, Montreal, Dr. McLennan brought helium to the notice of the world, as Madame Curie brought radium to the attention of scientists. Last year this Canadian physicist left his laboratory at McGill to spend the evening of his life in England, and in his home at Virginia Water he has expressed to me his faith in helium as the one gas which may make the airship of permanent value in the world.

Canada's Sources of Supply

In the absence of a natural supply of helium gas in Great Britain, so far as known at the present time, Dr. McLennan relies on sources of supply in Canada, so far as the British Empire is concerned. It was there that he discovered helium gas, and by so doing added it to the natural resources of that Dominion. At present the Canadian supply is not of outstanding importance, but there are expectations of a large and possibly inexhaustible supply in the Provinces West of the Great Lakes, where petroleum and natural gas, particularly in the Turner Valley area, have been located, and where new industries based on these raw materials are coming into existence in Alberta, Saskatchewan and Manitoba.

In the United States the Government at Washington has been experimenting with helium gas since its introduction, and is now developing an airship programme with the view to putting Germany's Zeppelins in the shade. In several parts of the country this gas is now obtainable, and its

export to Europe has been regarded as of some commercial importance in the future, though if France has equally large supplies, and is willing to export them, there may be no demand for the American article this side the Atlantic.

It will be recalled in this connection that two or three months before the dismantling of the R.100 began last November, the United States thought of buying it for a training ship, an indication of the seriousness with which the American Government regards the airship as a future factor in military operations. Since then the *Akron*, the largest of the world's airships, has had some fairly successful flights, while a still larger airship is now nearing completion.

Possibilities of French Discovery

Dr. McLennan has no doubt that airships, inflated with helium gas, will by and by be widely used both for civil and military purposes. In time he expects them to figure largely in competition with other forms of travel across the North Atlantic, and also across the North Pacific, though these routes may not see them running with regularity for some years yet. He has no confidence in synthetic helium, while to extract it from the air does not appear to him to be practical.

Despite the unfortunate end of the R.100, Dr. McLennan thinks it advisable for England to continue its airship investigations. With helium gas made available both within and without the Empire, the safety of the lighter-than-air machine appeals to him as a guarantee of its practical utilisation, while for the uses of transport he regards it as likely to be always complementary to the aeroplane.

Apparently, the discovery in France is not welcomed so much from the commercial side of aviation as from its military side. France has now the largest fleet of aeroplanes in the world. If by helium gas of its own production it can eventually outstrip Germany in airships, it may occupy in Europe a commanding position in the matter of aerial navigation. While that might still have been possible by importations of helium gas, to be dependent wholly on foreign imports is not of much account in war time, which is always a consideration of the utmost importance with the French Government.

The Dominions' Interest

Canada would like to see the airship become a permanency in the development of air routes within the Empire. It has at St. Hubert, near Montreal, a mooring mast and aerodrome, which have cost some £400,000, but which have only been used to advantage on the occasion of the transatlantic trip of the R.100 two years ago. This airport was developed at a time when dirigibles were being built under the auspices of the British Air Ministry, when there was a prospect of a service being established between Canada and England. When helium gas is produced in sufficient quantities in Canada there may thus be airships again in and out of St. Hubert.

For this reason Canada is interested in the proposal recently made by private capitalists in Germany, the United States and England for the development of a North Atlantic air service. Everybody in and around Cardington is interested for the same reason. With a strong company operating airships in Europe, deriving its supplies of non-inflammable helium gas from France, the monopoly of the United States in this product would be broken. Such airships could not be built for much less, if any, than the large helium-filled ships built and building in America, which cost well over £1,000,000 each.

As a matter of fact, the Dominions have not viewed with favour the abandonment of dirigible operations, either temporary or permanent, by the British Air Ministry. And now, with helium of its own, France will probably come to the front before long with dirigibles as formidable as any built in the United States or Germany. This will be a further incentive to the Dominions to give encouragement to private construction and operation, in order that the British Empire may not be behind in the race for aerial supremacy.

C. P. M.



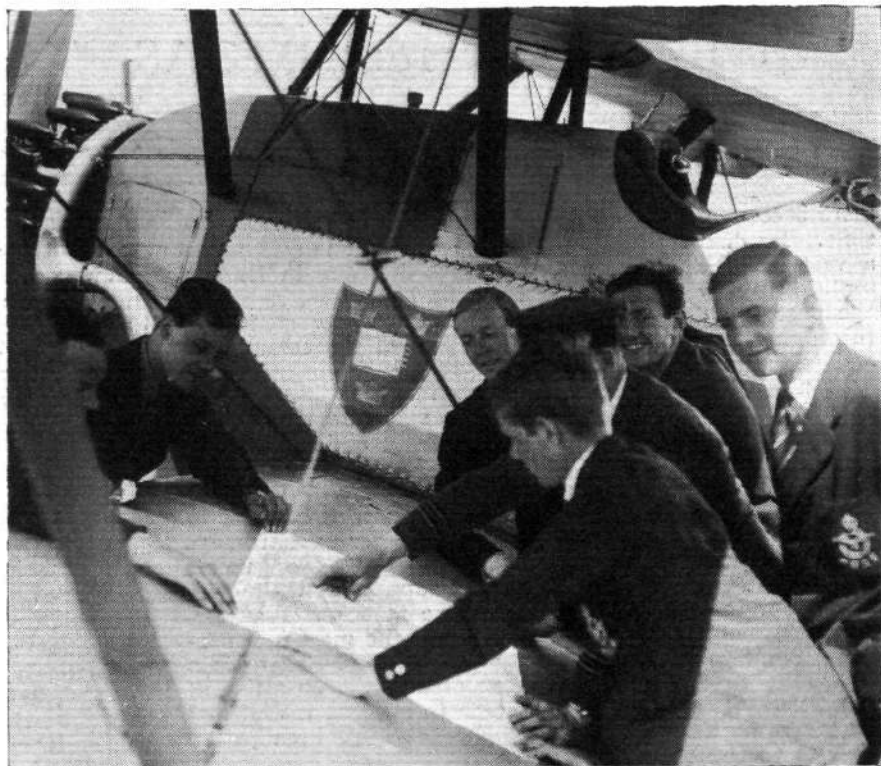
OXFORD UNIVERSITY AIR SQUADRON

FOR the second year in succession, the Oxford University Air Squadron has gone into camp at Eastchurch Aerodrome for its annual attachment. This year has seen one considerable change, namely, the substitution of the Armstrong-Whitworth "Atlas" for the Bristol Fighter as an advanced training two-seater machine. The strength of the squadron remains the same as before, namely, 75 members, and the waiting list is always a long one.

The annual report for the year 1930-31 makes very interesting reading. Before the end of the year's training 72 members of the squadron flew solo, and 33 took Proficiency Certificates issued by the Air Ministry. Sixty-nine members completed over three hours' solo flying, of whom 30 had only flown solo for the first time two or three days before. During the year the total number of solo flying hours amounted to 1,108.

Cross-country flying is on the increase. Members of the squadron visited most of the nearer aerodromes in the southern and eastern counties while the more experienced of them flew further afield into Gloucestershire, Norfolk and Cheshire. There was no instance of anyone losing his way. Only one forced landing took place, when the pilot landed his machine skilfully in a meadow in Suffolk without any damage.

During the year those members who had sufficient experience were taught to fly in formation. Group Capt. Roderic



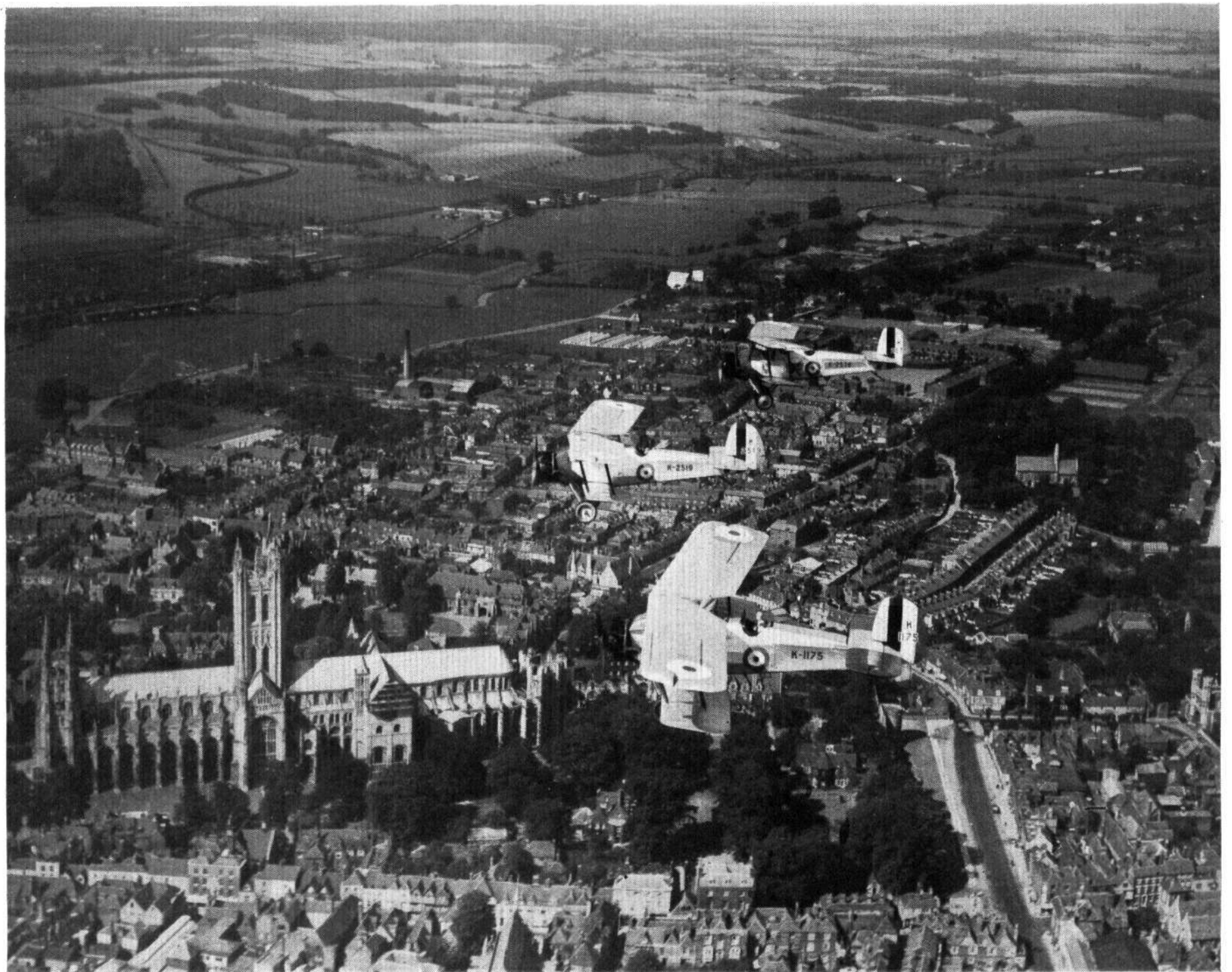
Members of Oxford University Air Squadron studying a map. (FLIGHT Photo.)

Hill, the Chief Instructor, remarks in the report, "The value of this form of flying lies in its power of training the pilot to handle his aeroplane with confidence and precision. Before he has learnt to fly in formation, a pilot is like a car driver who has never driven in traffic. Training in formation flying develops an appreciation of relative speeds; it enforces flying discipline, consideration for others, and team work in the air. Not least, it gives members a vision of their squadron in the air; and, judging from my own experience, the pilot is indeed



A formation of Armstrong-Whitworth "Atlas" machines of O.U.A.S. flying along the coast of the Isle of Sheppey. (FLIGHT Photo.)

OXFORD LOOKS
DOWN ON CANTER-
BURY: The O.U.A.S.
"Atlas" machines find
a natural attraction in
beautiful old cities and
buildings. (FLIGHT
Photo.)





SWINGING THE COMPASS : Group Capt. Roderic Hill, M.C., A.F.C., instructs the Oxford men at Eastchurch. (FLIGHT Photo.)

insensitive who can march in an aerial phalanx without a strange feeling of elation. Our members showed a surprising aptitude in formation flying, and those who took part in it gained much in *esprit de corps*."

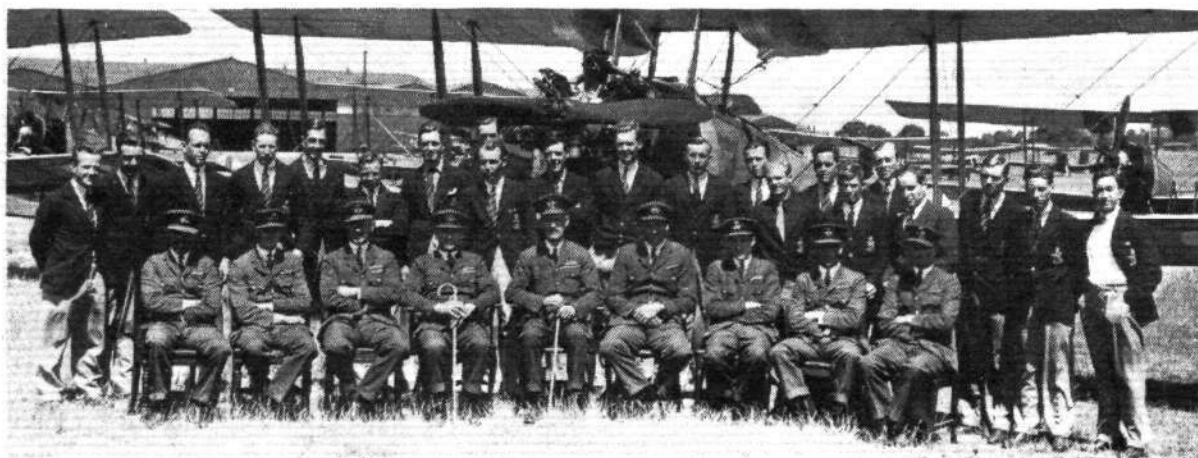
During the year five members were nominated for permanent commissions in the Royal Air Force. One, W. E. Coope, having taken second-class honours in Modern Languages, was given 18 months' seniority. H. R. A. Edwards (the rowing Blue, and brother of the 1931 King's Cup winner) took a pass degree and J. M. Freeman fourth-class honours in Engineering Science. They were given 12 months' seniority. One member was found medically unfit, and one failed to take a degree, and so did not qualify for a commission.

About two-thirds of the direct entry into the flying categories of the Reserve of Air Force Officers come from the Universities of Oxford and Cambridge. In the year under review, 22 members of Oxford were granted Reserve commissions.

With regard to the type of undergraduate who is chosen for the University Air Squadron, the report says:—"Although the University Permanent Commission Scheme may make its strongest appeal to the undergraduate reading engineering or natural science, the duties of the Royal Air Force are sufficiently various for those interested in humanistic subjects to find unexpected chances of exercising their talents. For example, intelligence work in

foreign countries is a fascinating study in itself. Particularly when the University man comes to read for the Royal Air Force Staff College will he feel the benefit of his earlier education, whatever subjects he has taken. What the Service looks for in the University candidate is perhaps a special measure of certain qualities, partly of intellect and partly of character, that are important in successful command and administration; adaptability, capacity to think constructively, and at the best, clear vision. The Royal Air Force should benefit greatly by a small but regular intake from this University of the type of man likely to satisfy this need."

During term the members fly at Upper Heyford, where six aeroplanes, four Avros and two "Atlas" machines are maintained by the Station Flight. The four officers of this flight give the members instruction in flying, and the Chief Instructor (Group Capt. Roderic Hill) and the Instructor (Sqd. Ldr. Mellersh) also give flying instruction when they can spare the time from their duties in the headquarters in Oxford. During the annual attachment, the number of instructors and of machines is increased, and all are kept very busy. Not long ago it was considered an achievement for a member to fly solo at his first camp. Now, practically all members who attend camp go home with solo flying to their credit, even if they have never been in the air before. In the year under review, only one member who attended camp failed to go solo.



Instructors and members of Oxford University Air Squadron at Eastchurch. (FLIGHT Photo.)

AIR TRANSPORT

Report on Civil Aviation

WE give below a *résumé* of the "Report on the Progress of Civil Aviation, 1931," which has just been issued by the Air Ministry, a copy of which may be obtained from H.M. Stationery Office, Kingsway, W.C.2 (price 5s. net).

Imperial Airways, Ltd.

During 1931 Imperial Airways, Ltd., operated daily air services between London and the Continent and weekly services between England and India and between England and Central Africa. A total mileage of 623,000, representing a total 797,339,000 h.p. miles, was completed during the year in the course of subsidised flights on regular European services. On the services to India and Central Africa 653,900 miles were flown.

The organisation of the final sections of the London-Cape Town airway was completed during the year. The through weekly service between England and South Africa was inaugurated on January 20, 1932, the time-table allowing 10½ days for the 8,000 miles flight.

AIR SURVEY AND PHOTOGRAPHY.

A great deal of useful work was carried out by both the Aircraft Operating Co., Ltd., and the Air Survey Co., Ltd., the former being chiefly engaged in the completion of a large survey of the city and district of Rio de Janeiro, Brazil, and in the preparation of maps in connection with the contracts for the survey of towns in Northern Rhodesia. The latter company continued its operations in India and also in Africa, where the survey of the Upper White Nile, commenced in the previous year, was extended to Uganda and Belgian Congo, the total area involved being nearly 20,000 sq. miles. It is estimated that the survey, which will be completed in less than 27 months, would have occupied 10 years using normal ground methods.

Aerofilms, Ltd., undertook during the year a number of important contracts for air photography, one of the most important and interesting being that for the preparation, for the London Electric Railways, of a mosaic map on the scale of 25 in. to the mile, covering the route of the new underground extension from Finsbury Park to Cockfosters, a distance of 9 miles.

MISCELLANEOUS COMMERCIAL FLYING AND TRAINING ORGANISATIONS.

Detailed information is given concerning the activities of National Flying Services, Ltd., Airwork, Ltd., the de Havilland School of Flying, Air Services Training, Ltd., the College of Aeronautical Engineering and C. D. Barnard Air Tours, Ltd. The latter concern, in conjunction with the *Daily Mail*, were responsible for the organisation and operation of Great Britain's first "air circus." A *résumé* is given of the work of the Guild of Air Pilots and Air Navigators of the British Empire. The Johnstone Memorial Prize which is given by this Guild for the best feat of navigation was awarded to Mr. F. C. Chichester, to whom it was presented by H.R.H. the Prince of Wales.

LIGHT AEROPLANE, GLIDING CLUBS AND PRIVATE FLYING.

This movement continued to grow steadily, and at the end of 1931 there were 23 Government-assisted clubs, as compared with 19 in the year previous. The average total membership of these clubs during the year was 6,711, as compared with 5,808 of the previous year. On December 31, 1931, 1,573 members held civil pilots' "A" licences, which shows an increase of 303 over the previous year. The total number of light aeroplane clubs in operation in the United Kingdom at the end of the year, including six operating without Government assistance, was 32, with an aggregate membership of over 9,000.

Likewise, the Gliding Club movement has grown steadily. At the end of the year there were no less than 86 clubs, with a total membership of 5,500.

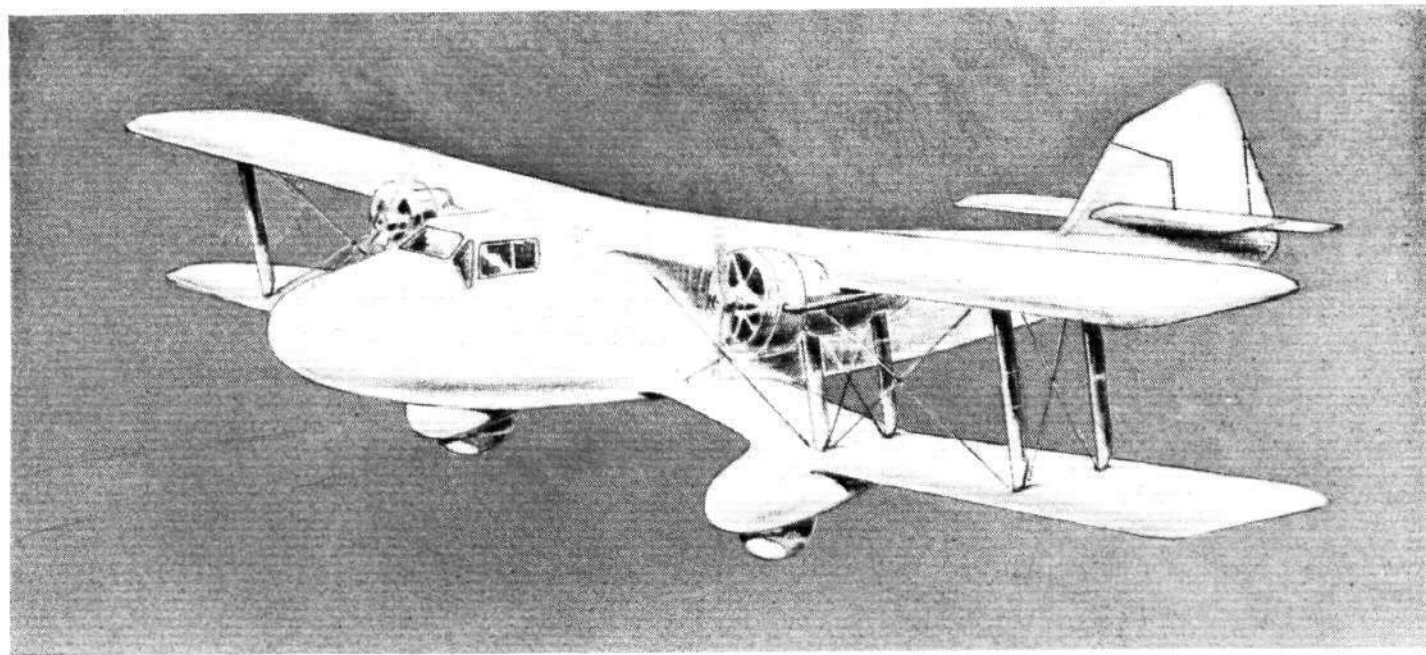
Air Races and Competitions.—Details of the 1931 Schneider Trophy Contest, the King's Cup Race, other races, and long-distance flights are dealt with. Continued improvements in the design of aircraft and aero engines, progress in the development of air routes and in the science of air navigation resulted in some remarkable long-distance flights being carried out during the year, and the most noteworthy of these (16 in number) are recorded in detail.

AIR MAIL TRAFFIC.

The development of the letter air mail service during the year was the most striking that has occurred since the service was established. During the year about two and a quarter million letters were despatched by air, the increase over 1930 being half a million letters, while the total weight of the letter air mail was 52.4 tons, representing an increase of 29 per cent. over 1930 and no less than 74 per cent. over 1929.

AIRCRAFT DEVELOPMENT.

The year 1931 was not a year which saw important new developments in aircraft, but it saw the completion of earlier efforts. The Handley Page type 42 and the Short



The Air Ministry Mail Carrier under construction by Boulton & Paul, Ltd. (Reproduced by permission of H.M. Stationery Office.)

"Kent" flying boats were put in operation by Imperial Airways. The world's largest float-plane, the Short "Valette," carried out a long-distance flight in Africa, and gave indications of being aerodynamically one of the most efficient aircraft yet built. Two new models of the "Autogiro" were produced, which, says the report, "may soon take their place among the types of light aircraft in general use. The most striking event of the year was the winning of the Schneider Trophy and the establishment of a high-speed record with a modified version of the seaplane which won the 1929 contest. The development of the racing Rolls-Royce engine may, says the report, have important effects on design during the next few years.

The only civil aircraft actually completed during 1931 which may be said to indicate any new important development was the Avro "Mailplane," the fastest commercial aircraft yet produced in this country.

Other civil machines completed during the year (all of which have been already described in FLIGHT) are the Blackburn "Segrave" four-seater twin-engined cabin monoplane with two "Gipsy 3" engines; the Arrow "Active" two-seater light biplane with Cirrus "Hermes 2B" engine; the "Autogiros," types C19, Mark 4, and C24 (alluded to above); the Vickers "Velox" biplane with two "Jupiter" engines, a freight-carrier developed from the "Vellore 4"; the Saunders-Roe "Spartan" monoplane mail-carrier with three "Gipsy III" engines; and the Monospar monoplane with two 45-h.p. Salmsons. Under construction at the close of the year was the Armstrong-Whitworth A.W. XV high-wing monoplane (the "Atalanta") with four 340-h.p. "Double Mongoose" engines for use by Imperial Airways on the African service.

Under the Air Ministry experimental programme, the "Valette" was completed. The report remarks that it has very attractive qualities for operations from inland waters, but not from the open sea. Under construction were one monoplane and one biplane designed by the Blackburn firm. During the year a tender was received for the Boulton & Paul mail-carrier (of which an illustration is given), which complied with the revised Air Ministry specification (namely, a cruising speed of not less than 150 m.p.h., a payload of 1,000 lb., and a range of 1,000 miles). As a result of the cancellation of the contract for the Mediterranean Flying Boat, a contract was placed early in 1932 for an aircraft of this type.

The six-engined flying boat was commenced by the Vickers-Supermarine firm, but as a result of Government economy measures, was abandoned. All other proposals for new types of experimental aircraft have been abandoned for the time being.

ENGINES.

The construction of the racing engines (Rolls-Royce) for the Schneider machines is described as an important achievement. Work proceeded on several unorthodox types of power units, notably on compression-ignition engines.

AIRSHIPS.

It was decided to sell the airship R.100 as scrap, and by the end of the year the process of breaking her up was almost complete.

GROUND ORGANISATION.

At the end of 1931 there were 57 licensed "permanent" aerodromes, landing grounds and seaplane stations in the United Kingdom as compared with 50 in the year previous.

The subject of roof aerodromes has continued to excite

interest, and the Air Ministry has been asked to examine several schemes. The Report continues:—"The importance of clear approaches and clear take-off runs for all wind directions, together with the magnitude of the impact load which the roof must be designed to withstand, are amongst the important points generally ignored."

HIGH-TENSION CABLES.

The Air Ministry takes the view that the towers and cables in certain sections of the routes should be marked by day and illuminated by night. A committee has been set up to examine the technical aspects of the problem.

CIVIL AVIATION VOTES.

A net sum of £497,400 was provided for expenditure in connection with civil aviation for 1931-32. Of a total sum of £520,000 to be provided for subsidy payments to Imperial Airways, Ltd., £155,000 was contributed from Dominion and Colonial votes. The net provision under this heading was therefore £365,000 as compared with £408,000 in 1931.

LICENCES AND CERTIFICATES.

On December 31, 1931, there were 2,091 "A" Class, 315 "B" Class licences or certificates current, and the corresponding figures for 1930 were 1,708 and 252.

INVESTIGATION OF ACCIDENTS TO CIVIL AIRCRAFT.

In the course of civil aviation in this country during the year, there were altogether 52 accidents requiring notification, one less than the previous year. No lives were lost on the regular transport air services, although of the foregoing number 15 resulted in loss of life, eight involved non-fatal, but severe, injuries to persons, and the remaining 29 had no serious consequences beyond extensive damage to the aircraft. One mishap occurred on the cross-Channel air routes, an Imperial Airways' machine being damaged in a forced landing due to engine failure, but no one was hurt.

DOMINIONS, INDIA AND THE COLONIES.

A total sum of £1,613,153 was voted for 1931-32, as compared with £2,125,501 for 1930-31. These figures show considerable decrease, but this is, however, natural, owing to the general economic situation.

The miles of routes in regular operation during 1931 give a grand total of 24,722 as compared with 23,005 during the previous year. The lack of any very substantial increase is largely accounted for by the fact that restrictions have been imposed on the services in Australia and Canada, with the result that the route mileage in operation in the Dominions, India and the Colonies, shows a decrease of approximately 3 per cent.

The total number of light aeroplane clubs (i.e., both Government-assisted and non-assisted) in 1931 was 117, the same as in 1930. Government-assisted clubs increased in number from 73 to 82, but the unassisted clubs fell from 44 to 35.

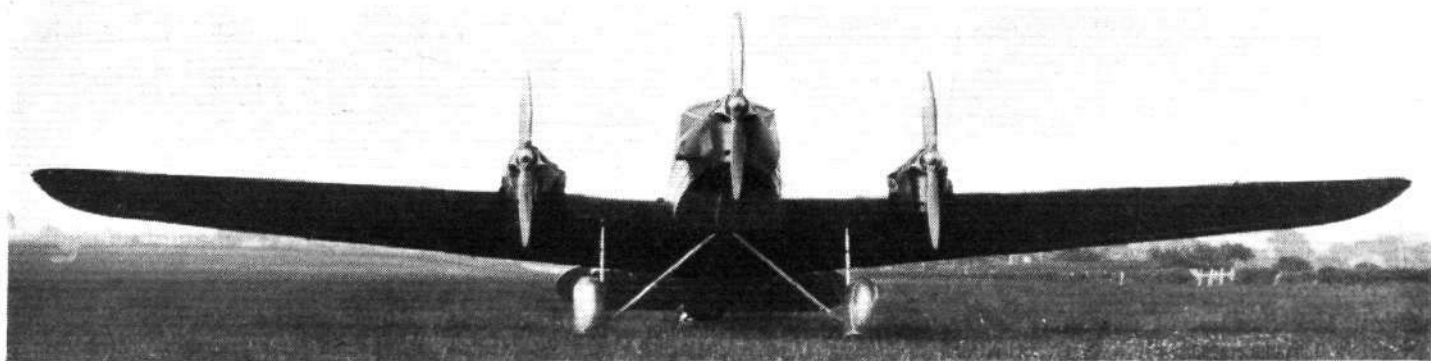
FOREIGN COUNTRIES.

Information concerning important developments in Belgium, France, Germany, Holland, Italy, Sweden, Switzerland, and the other European countries, United States of America and Central and South America is given. An Appendix includes "Regular Air Transport, route mileage and miles flown throughout the world" (page 95), while another gives "Statistics of Regular Air Services" (pages 96 and 97).

New Imperial Airways Terminus in Paris

LARGE increases in passenger traffic by Imperial Airways between London and Paris—figures for June showing, for example, that 4,311 travellers flew between the two capitals in the company's airliners, as compared with 2,206 for a similar period last year—have led to a decision to transfer the arrival and departure point in Paris from the Avenue de l'Opera to the Hotel Bohy-Lafayette, in the Square Montholon, Rue Lafayette. Great difficulty has been experienced, owing to growing pressure, in dealing with large numbers of passengers and increasing quantities of luggage, in the space at present available, while traffic congestion in the Avenue de l'Opera has rendered it no easy matter, at busy periods, to deal with the cars and

taxicabs of passengers. Definite advantages will accrue from the change to the Hotel Bohy-Lafayette. For one thing it is six minutes nearer to the airport of Le Bourget than are the existing premises in the Avenue de l'Opera; and, for another, it is outside the area of heavy traffic congestion. Furthermore, it is near the Gare du Nord, and provides every convenience for passengers, including baths, hairdressing saloons and a theatre-ticket office; while as yet another advantage it is extremely easy to locate, the Rue Lafayette running direct from the centre of Paris to the Gare du Nord. This change from the Avenue de l'Opera to the Hotel Bohy-Lafayette took place on July 20. The office at 38, Avenue de l'Opera will still be retained as a booking office and inquiry bureau.



The Spartan "Cruiser"

HERE was a time, and not so very long ago, when it was a common thing to hear the complaint that a potential purchaser of aircraft could not obtain from a British firm anything between the light aeroplane two-seater of some 100 h.p. and the large commercial "air liner" of several hundred or even over 1,000 h.p. During the last two years things have changed radically, and there are now available to the purchaser of aircraft a very complete range of types and sizes, from the smallest single-seater through two-seaters, three-seaters, four-seaters and six-seaters, to the small, intermediate and large commercial aircraft. He would be a difficult man to please who could not find among them a type to suit his particular needs.

A six-seater which has recently made its appearance, and which should find a large field of usefulness, is the new three-engined monoplane produced at Cowes by Spartan Aircraft, Ltd., and to be marketed as the Spartan "Cruiser." The close connection between Spartan Aircraft and Saunders-Roe, Ltd., is doubtless responsible for the similarity in structural features to Saro flying boats which the "Cruiser" exhibits. These features have by now been well tried out in such types as the Saro "Cutty Sark," "Windhover" and "Cloud" flying boats, and their application to

THE SPARTAN "CRUISER" Three Gipsy III Engines

		Dimensions	
		Ft. in.	M.
Wing span	54 0	16.45
Length overall	39 2	11.95
Height overall	10 0	3.05
		Sq. ft.	M ² .
Wing area	436.0	40.5
Area of ailerons	40.3	3.74
Area of tailplane	30.5	2.84
Area of elevators	31.5	2.93
Area of fin	12.0	1.11
Area of rudder	20.0	1.86

		Weights (Passenger Machine)	
		Lb.	Kg.
Tare	3,400	1 545
Pilot	170	77
Five passengers	850	386
Luggage	100	45
Fuel for 4 hours	600	273
Oil	70	32
Loaded weight	5,190	2 358

		Weights (Freighter)	
		Lb.	Kg.
Tare	3,320	1 508
Pilot	170	77
Freight	1,000	455
Fuel for 6 hours	900	410
Oil	75	34
Loaded weight	5,465	2 485

		Performance	
		M.p.h.	Km./hr.
Maximum speed	135	217
Cruising speed	110	177
Initial rate of climb	600 ft./min.	(3.05 m./sec.)
Ceiling	13,000 ft.	(3 960 m.)

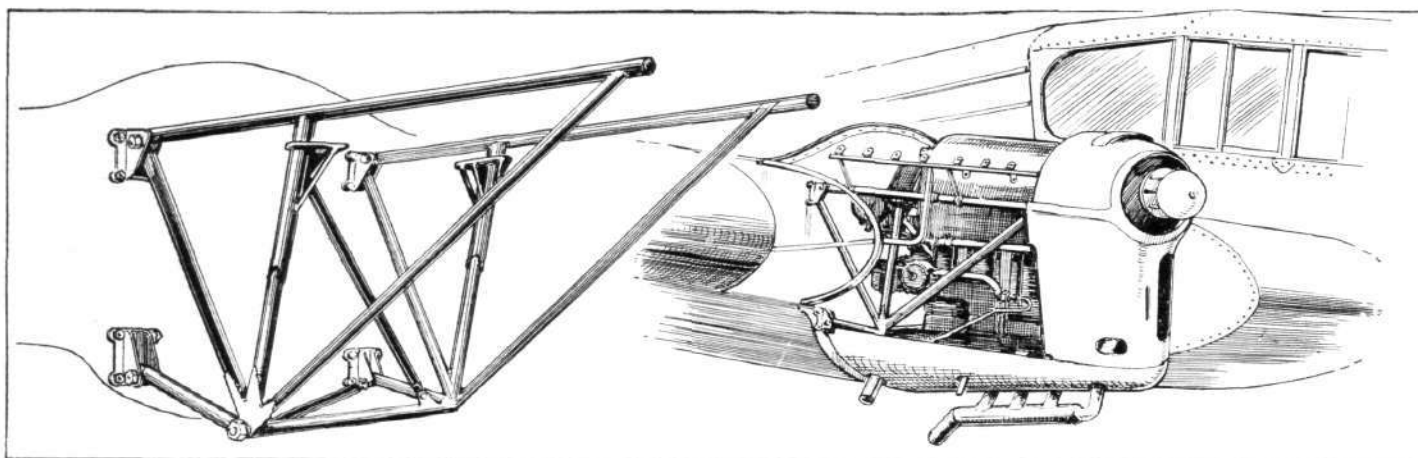
When fully loaded, the machine will not only maintain height, but will climb with either of the three engines stopped.

a landplane type is to be regarded as very sound business.

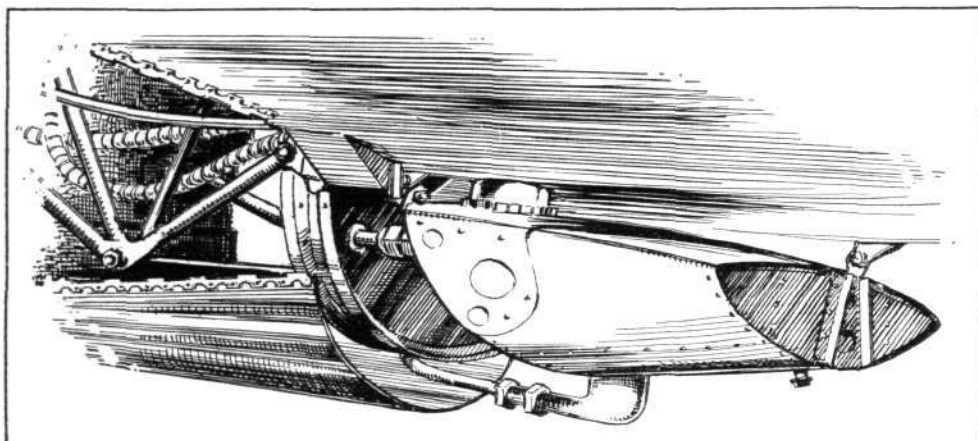
Fitted with three de Havilland "Gipsy III" inverted engines, the "Cruiser" carries, when equipped for passenger work, five passengers in addition to the pilot. This represents a power of 72 h.p. per paying passenger, which cannot be regarded as excessive in view of the good performance of the machine. When the cabin furnishings are removed and the "Cruiser" used as a freight carrier, the pay load becomes 1,000 lb., or 2.78 lb./h.p., for an endurance of 6 hours and a cruising range of approximately 700 miles. If the range is shortened, the pay load is, of course, correspondingly increased. As the machine has been designed to, and actually does, fly on any two of its three engines, it should cruise at a power expenditure low enough to ensure that engine failure should be almost unknown, and forced landings to all intents and purposes eliminated.

The ratio of gross weight to tare weight is always worth examining, as it represents to some extent the "structural efficiency" of the aircraft. For the Spartan "Cruiser" as a passenger machine the ratio is 1.53, and for the freight-carrier it is 1.65. Both figures must be regarded as good, and indicate that considerable engineering skill has been brought to bear on the structural design.





ABOVE : On the left one of the wing engine mountings. On the right a wing engine installation. (FLIGHT Sketches.)



ON THE LEFT : The oil tank of each wing engine is mounted in the fairing behind the engine. (FLIGHT Sketch.)

The aerodynamic efficiency also appears to be above the average. The Everling "High-speed Figure" $\frac{\eta}{2k_D}$ has a value of 20.25, which points to a very low minimum drag coefficient. In appearance the "Cruiser" is certainly "clean," and the performance indicates that there is good scientific foundation for this impression.

The cabin of the "Cruiser" is very well arranged, with comfortable seats along the sides, a good view through windows in the sides, and excellent lighting through the side windows and the roof lights.

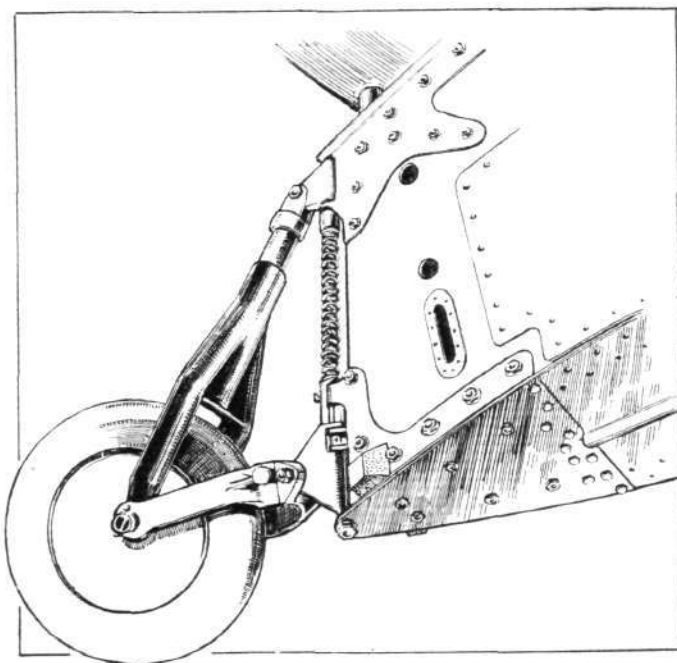
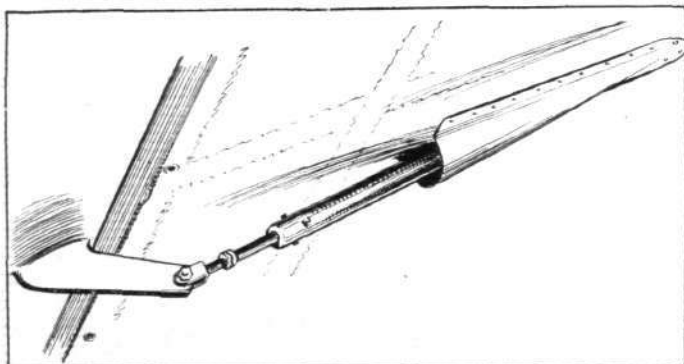
Fuselage.—The fuselage is of metal construction throughout, and follows closely in principle, although not, of course, in actual shape, the hulls of the "Saro" flying boats. A series of light frames give the fuselage its transverse sections, while the planking or covering is of "Alclad," stiffened by longitudinal corrugations spaced several inches apart. The planking is riveted to the frame flanges.

Wing.—The cantilever monoplane wing is of all-wood construction, with two main spars of box section, having spruce flanges and three-ply sides. The wing ribs have spruce flanges and three-ply webs, and the covering is a three-ply skin which assists in providing torsional stiffness. Near the fuselage the wing covering is thickened and stiffened to form a walkway to the cabin door.

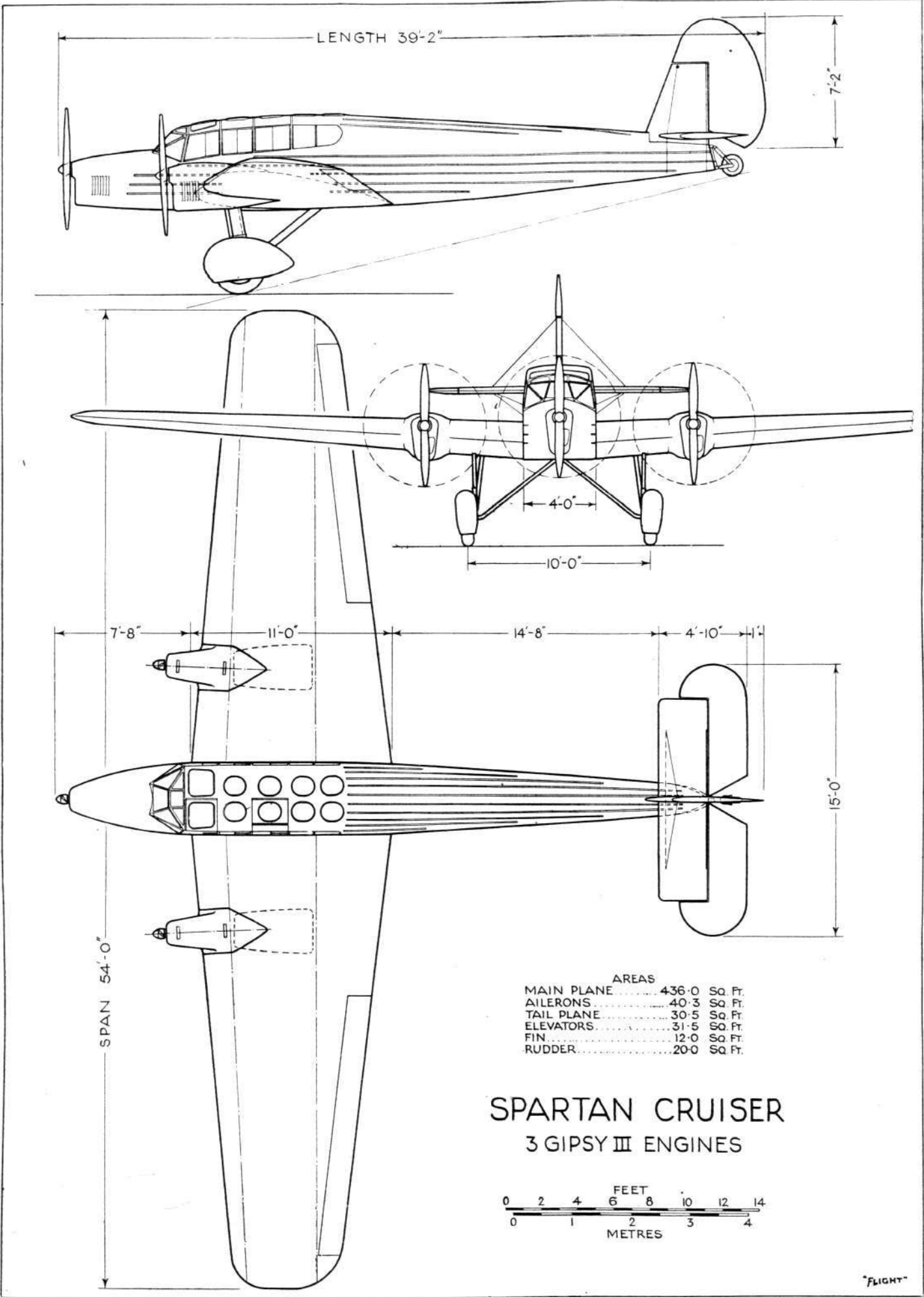
Tail Unit.—The complete tail unit is a Duralumin structure covered with doped fabric. The rudder and elevators are provided with horn balances, and tail trimming is by a screw jack operated by a wheel in the pilot's cockpit.

Power Plant.—The three De Havilland "Gipsy III" engines are mounted two in the wings and one in the nose of the fuselage. If desired, alternative types can be fitted provided they are of reasonably the same power and general type. The engine mountings are of steel tube construction, and the wing engines are faired carefully into the wing surface. As the central engine is rather high above the ground, it has been fitted with hand-turning gear. The outboard airscrews are within reach from the ground, and the outboard engines are therefore started by swinging the propellers.

Fuel System.—There are two main petrol tanks, housed in the wing between the main spars, each tank being situated in the wing just behind its engine. Each tank has a capacity of 60 gallons (273 litres), which gives the machine an endurance of six hours at an economical cruising speed of 110 m.p.h. When the machine is used as a passenger carrier the tanks will not normally be filled up, but will contain enough fuel for about four hours' cruising. The tanks are interconnected with large balance pipes. Each engine is provided



ON THE "CRUISER" : Left, the aileron crank and its fairing. On the right the tail wheel, which is sprung and swivelled, the sideways movement being limited by rubber buffers. (FLIGHT Sketches.)



THE SPARTAN " CRUISER " : General arrangement drawings. The circles in the plan view are roof lights and not seats.



THE SPARTAN "CRUISER": "Spats" over the wheels add to the already clean design. The engines are de Havilland "Gipsy III."

with a fuel pump which feeds direct to the carburettor. In the event of a pump failing, a cross-connection is arranged whereby the engine is supplied by another pump. Fuel contents gauges are fitted to each tank.

Lubrication System.—The oil tanks are placed in the fairings behind each engine.

Undercarriage.—The undercarriage is of the "split" type and has a wide track (10 ft.). The telescopic strut, which runs to the under-side of the front spar, is of the oil-cum-steel spring type. The bent axle hinges on the centre line of the bottom of the fuselage, in line with the front spar, while the radius rod runs to the rear spar.

Controls.—Elevator and ailerons are operated by a hand wheel on a hinged column, while the rudder control is a parallel-motion, easily adjustable bar. From the pilot's controls to the various control surfaces the run through

the machine is by rods and cables. Engine controls are conveniently placed, and operate through rods and torque shafts.

Cabin Arrangement.—The fuselage is sufficiently wide to permit of placing the seats along the sides, with a gangway down the centre of the cabin. Four of the seats are placed between the wing spars, while the pilot's seat (on the port side) and that of the fifth passenger are in front of the leading edge of the wing. The windows in the sides of the cabin are of "Triplex," while those in the roof are of celluloid. The side windows are made to slide for ventilation purposes.

Behind the cabin is a large stowage space for luggage.

The main dimensions, areas, etc., are shown on the three-view general arrangement drawings, and the data relating to the Spartan "Cruiser" have been collected together in the table on p. 689.



Raising the Submarine M2

THE Parliamentary Secretary to the Admiralty stated in the House on July 13 that it had been found that the main-tank blowing valves inside the hull of the lost submarine M2 were open, which had not previously been known. Work had to be suspended until this could be dealt with. During the week-end July 9-11, an attempt to raise M2 was made and the bow was raised some 15 ft., but a serious leak from the bow torpedo tubes developed, and the attempt had to be abandoned until that was located and stopped.

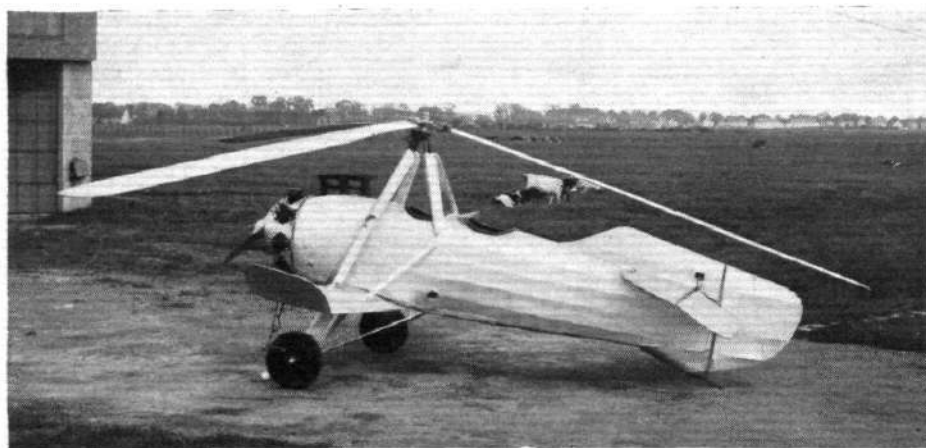
An Aero Club for Manchester

If the negotiations which are under way at Barton, the airport of Manchester, are successful, there will shortly

be a club established there entitled the "Manchester Aero Club." It seems somewhat surprising that this club has not been formed before, particularly in view of the exceptional facilities which are to be found there.

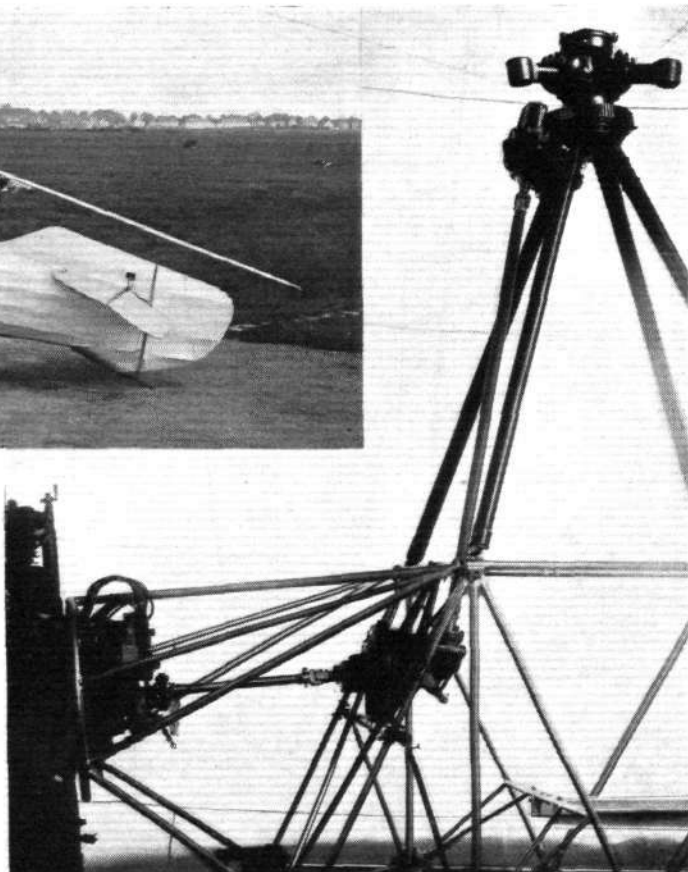
An Airport for Goole

MR. J. A. CURRAN, the President of the Goole Chamber of Trade, is evidently a far-sighted and practical man, for at a recent meeting of the Chamber he suggested that it was high time an airport was established at Goole. The Urban District Council has been asked to inquire into the question of providing facilities for visiting aircraft, and we may hope, therefore, that it will not be long before a municipal landing ground is established.



THE
FIRST FOCKE-WULF
"AUTOGIRO."

Of the C.19, Mark IV, type, this machine is fitted with a Siemens-Halske 7-cylinder radial engine of 110 h.p. The first test flights were carried out by Capt. A. H. C. Rawson, and will now be continued by the Focke-Wulf and D.V.L. pilots. On the right the engine-driven rotor starter, pyramid and rotor head.



AIRPORT NEWS

CROYDON

PASSENGER figures continue to break records, and it is a rare occasion if a machine leaves without a full load.

On Sunday H.R.H. Prince George, piloted by Flt. Lt. Jack Armour, visited Croydon to see Lord and Lady Louis Mountbatten off on the 12.30 service. Other notable passengers of the week included Mr. Augustus John, and Mr. Elliot, the jockey, who is, of course, a familiar figure on the airlines. On Wednesday Mr. Olley, of Imperial Airways, took a special mail to Cherbourg, to catch the boat to Canada, which is carrying the Imperial Conference delegates to the Conference at Ottawa. Included in the mail was a personal letter from His Majesty King George V to the Governor-General of Canada.

A new smoke beacon, which is quite satisfactory, has been installed in the centre of the aerodrome to give pilots correct wind direction when landing.

The old gas-operated boundary lights have been removed now that the new electric ones have been thoroughly tested and proved efficient. Several of the new ones have already been knocked over, so now they have been enclosed in trellis-work guards painted white and red, the only part now visible being the actual light itself.

Flt. Lt. Chris Clarkson came over on his Comper "Swift" on Saturday. These sturdy little machines always attract a great deal of attention on their visits.

The Luft Hansa G.38 is now regularly operating the



THE PLYMOUTH AIRPORT COMMITTEE: Reading from left to right, Mr. F. J. Dean (Airport Officer), Ald. H. M. Medland, Ald. L. R. Dunston, Counc. W. H. J. Priest, and Ald. G. Scovele. (FLIGHT Photo.)

London-Amsterdam-London service, and is giving trouble-free service to date. It seems that these larger aircraft appeal to the travelling public.

During the week-end many private owners visited Croydon. A few I saw included Mr. Roger Frogley, the late dirt-track rider, Mr. Selfridge, Junr., the Hon. Mr. Hachisuka, Messrs. Styran, Cathcart-Jones, Nelson and Jackaman.

The Aerodrome Hotel authorities have inaugurated Saturday evening dances on the hotel roof, and they seem to be popular with the local inhabitants. The atmosphere is decidedly Bohemian these days.

Traffic figures for the week:—Passengers, 3,304; freight, 81 tons. P. B.

FROM HESTON

SUNDAY, July 10.—Night flying took place, and in order to accommodate as many as possible of those desirous of viewing the lights of London from the air, was continued up to 12.30 a.m.

Monday.—Banco had two "Puss Moths" engaged; one was sent to Wimborne to pick up a passenger for Heston and one to Rochester on photographic work.

Tuesday.—Mr. and Mrs. Loel Guinness and Mr. Elsmere and Sir John Milbanke proceeded to Lyons in "Puss Moths." Col. Smith Barry, with one passenger, set off for St. Ingelvert, and Capt. Cazalet to Wexford, both in "Puss Moths." Capt. Neville Stack returned to Heston with the Spartan "Mailplane" after his trip to India. The Airwork School of Flying "Puss Moth" was loaned to Henlys, Ltd., and piloted by Mr. Stace to Teignmouth to convey Mr. Eric Kenny, secretary of Henlys, Ltd., and his bride on the first stage of their honeymoon. Banco had their "Puss Moth" engaged during the afternoon in taking photos of the Fleet at Weymouth.

Wednesday.—A large number of Dulwich College boys were shown round the Airport, some making joy flights.

Thursday.—Airwork School of Flying had two first soloists to-day—Lady Howard de Walden and Mr. Ivor Guest. The Argentine Air Attaché came to Heston to-day to study the organisation of the Airport. Mrs. Gordon Vereker left in her "Puss Moth" to join her husband at the British Embassy, Warsaw. Customs clearances were: Hillmans, Ltd., "Fox Moth," to Paris 8.30 a.m., returning 3 p.m.; Mr. Seversky, "Moth," one passenger, to Deauville; Herr Von Winterfeld, D-2212, one passenger, to Rotterdam; F-ALER, from Paris and return, with Viscomte de Sibour; Sqd. Ldr. Leslie, "Puss Moth," from Berck.

Friday.—Again the Airwork School of Flying had two

first soloists—Mr. James Hamilton and Dr. H. Gregory. Miss Gonda Van Raalte qualified for her "A" licence, and Lady Penrhyn took her first lesson. Banco had a pretty full day. During the morning a "Puss Moth" went to Haldon and another to Berck with two passengers. At 5.30 p.m. their Fokker left with a full complement of passengers for Berck. Other Customs clearances were:—Miss W. Spooner, "Puss Moth," one passenger, to Paris; Goldman, "Moth," one passenger, to Rouen and return; Maj. Nathan, "Puss Moth," to Nice, one passenger; R. Allen, "Moth," one passenger, to Berck; Sqd. Ldr. Leslie, "Puss Moth," one passenger, to Berck and return; Mr. Richardson, "Klemm," from Paris (Mr. Richardson celebrates his 70th birthday next week); Hillmans, "Puss Moth," two passengers, to Berck.

Saturday.—A party from the local Science and Arts Club paid a visit to the Airport during the afternoon. In all, parties from eighteen different clubs have up to the present booked dates for visits to Heston. Banco sent a "Puss Moth" to Berck with the Hon. MacAitken as passenger. Sqd. Ldr. Leslie made another trip to Berck and Maj. Petre, with one passenger, also departed for Berck in a "Moth." Herr Franz Kneer left for Paris in a "Moth" en route for Zurich. Lt.-Col. Shelmerdine, Director of Civil Aviation, was taken to Norwich by a pilot of Airwork School of Flying in the "Puss Moth" of Mr. Nigel Norman, returning during the evening. While Lord Waleran flew one of the School "Moths," Lady Waleran and Princess Catherine of Greece were taken up in the School "Puss Moth."

Sunday.—Sqd. Ldr. Leslie ("Puss Moth") left for Berck. G-ABPT, Mr. Scott, one passenger, returned from Rotterdam; G-EBZZ, Maj. Petre, one passenger, from Berck, and G-ABDM (Mr. Macpherson), from Paris. A party from the Romford Motor Cycling Club made Heston their rendezvous for to-day's meeting.

AIRISMS FROM THE FOUR WINDS



The Stainforth Weather Vane

WEYMOUTH College, where Flt. Lt. Stainforth was educated, is commemorating the splendid achievements of the Schneider Trophy winner and holder of the world's air speed record by erecting on the tower of the new School Chapel the handsome weather vane shown in the accompanying illustration. This weather vane was designed by Beresford Pite Partners, of 101, Great Russell Street, London, and constructed by C. R. Wyche, of 30, Colville Street, Nottingham—who, by the way, specialises in scale models of aircraft. As will be seen, it represents a scale model of the Vickers Supermarine S.6B (Rolls-Royce) Schneider machine, built up of sheet copper, which swings on ball bearings in the wind above the N.S.E.W. The airscrew, it should be noted, revolves in the wind. Col. the Master of Sempill will unveil this weather vane to-morrow, July 23.

An Aero Club for the Stage and Screen

SUCH a large number of those actively interested in the theatrical or film profession have learnt or are learning, to fly that they have decided to form a club of their own and Film Aero Club. The chairman is Mr. H. Wakefield, the honorary secretaries Mr. J. Raglan and Mr. Rivers. The flying headquarters will be at Hatfield Aerodrome and an inaugural Garden Party will be held there next Sunday. Amongst those who have already joined are Miss Marjorie Mars, Miss Paddie Naismith, Messrs. Bruce Belfrage, Victor Dell, Roy Findlay, D. Page and Walter Summers.

"Miss England III" Beats the Record

THANKS to the sporting generosity of Lord Wakefield, Great Britain has recaptured the world's water-speed record. On July 18 Mr. Kaye Don, piloting Lord Wakefield's *Miss England III* on Loch Lomond, attained an average speed of 119.81 m.p.h., beating the previous record of

111.71 m.p.h. held by Commodore Gar Wood by over 8 m.p.h. During one of Mr. Kaye Don's runs he attained a speed of 120.5 m.p.h. *Miss England III*, which was designed and built by John I. Thornycroft & Co., Ltd., is powered with two Schneider Trophy type supercharged Rolls-Royce engines, fitted with B.T.H. magnetos and K.L.G. plugs. Smith's instruments were used on the boat, which was also fitted with thermostatic control of water circulation by means of the well-known Smithermet units. Wakefield "Castrol" was, of course, the lubricating medium employed. Great Britain thus now holds the world's air, land and water speed records.

Loss of the Saro A.7

THE R.A.F. flying-boat Saro A.7 was lost between Scotland and Ireland on Wednesday, July 13. The crew of eight were all saved after some trying adventures. Since her cruise through the Mediterranean last year, which ended with a non-stop flight from Gibraltar to Plymouth, the A.7 has been handed over to No. 209 (F.B.) Squadron at Mount Batten, and this month she was being used on flights between Ireland and Scotland. On July 13 she started on a cruise from Tarbet, in Argyllshire, but engine trouble developed and she came down on the sea near the Maidens group of rocks off the coast of Antrim. For some reason the boat collapsed. A corporal and an aircraftman who were at work in the rubber dinghy were washed away, and after drifting for 5 hours came ashore at Ballygalley in Co. Antrim. The Greek steamer *Nicos* picked up the other six occupants, three officers and three airmen, from the wrecked boat, which afterwards sank.

Air Adviser to Greece

WING COM. R. M. BAYLEY, D.F.C., is succeeding Wing Com. G. B. Dacre as Air Adviser to Greece, and will have acting rank as Group Captain during his tenure of that appointment. Wing Com. Bayley has recently been on the staff of the Air Ministry. He was originally in the Accountant branch of the Navy, and joined the R.N.A.S. in 1917.

Flying Gymkhana at Doncaster

THERE will be a motor rally and flying gymkhana at the Armthorpe Aerodrome, Doncaster, on August 1, at 2 p.m. An invitation is extended to all private owners, club members and others to visit the aerodrome on that day. Further inquiries about the matter should be sent to the Doncaster Aviation Co., Ltd., 219, Westminster Buildings, Doncaster.



UPSIDE DOWN IN ITALY: A formation of Breda 19 biplanes flying upside down above the Tiber, on the occasion of the recent Royal Italian Air Force Display.

THE INDUSTRY

A TRIUMPH FOR BRITISH COAL

WE made an announcement in our last issue that the winner of the King's Cup Race flew on National Benzole. The National Benzole Co. have pointed out that this is not strictly accurate, but that this machine flew on National Benzole Mixture. This company also wishes to state the fuel used was their standard grade, and similar in every way to that which can be purchased through their pumps in all parts of the country.

Many people connected with aviation are still unaware of the difference between Benzole and petrol, so that perhaps a short article on the production of this fuel would not be without interest to our readers.

The company itself is a distributing organisation, owned and controlled by the producers of British Benzole, who are the coal, steel, iron and gas concerns of this country.

THE PRODUCTION OF BENZOLE

Unlike petrol, which is separated by distillation from crude petroleum, obtained by boring in geologically suitable areas, Benzole is produced from coal, and Britain was one of the pioneer countries in the production and development of this valuable coal by-product.

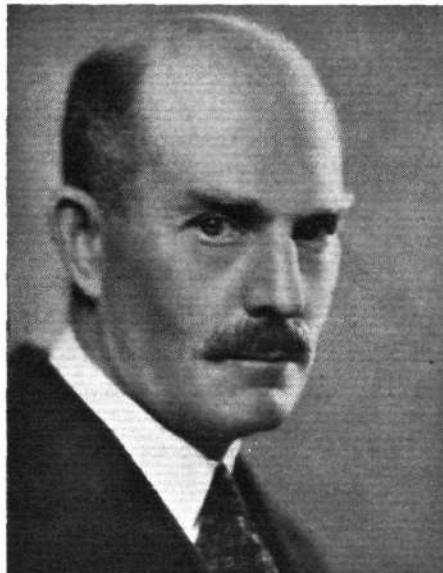
Coal is carbonised in coke ovens for the purpose of producing coke, which is normally required by the blast furnaces to reduce iron ore when making pig-iron.

The coal gas, which is driven off during the carbonisation process, contains vapours of motor benzole, tar, and other substances, and this gas is intimately mixed with creosote oil, which has the power of absorbing the benzole from the gas stream.

The creosote oil is pumped to the Benzole plant, and is there superheated to a temperature of approximately 120 deg. C., after which it is allowed to travel down a still, which is itself heated and up which a current of steam is travelling against the flow of the oil. By this means the Benzole is "stripped" from the creosote oil, and we have what is known as crude Benzole. This has been obtained from the coal originally placed in the oven.

In order to remove any unsuitable constituents, such as creosote oil, this crude Benzole is submitted to another distillation process, and is then agitated with strong acid, which operation removes any "gumming" constituents which may have been left in the Benzole. Following a water wash, the Benzole is then agitated with caustic soda and with an excess of water, and after a final distillation it is ready for use as a "water-white" motor spirit, free from acidity or alkalinity. This description is merely an outline of the process, and it can vary widely in different plants.

Owing to the fact that the process of gas manufacture is very similar to that of coke manufacture, a number of



Mr. Samuel Henshaw, Chairman of the National Benzole Co., Ltd.

the leading gas companies in this country extract the Benzole from their gas before sending it to the mains for power and illuminating purposes.

CHARACTERISTICS OF BENZOLE

Both petrol and Benzole are mixtures of what are known as hydrocarbons, that is, compounds of hydrogen and carbon in varying proportions, but whereas petrols mainly consist of the "paraffin" group of hydrocarbons with some "naphthenes" and some small percentage of "aromatics," motor Benzole consists essentially of the aromatic series.

The chief characteristic of the aromatic fuels is their power to suppress the phenomenon known as "knocking" in an internal-combustion engine, and it is for this reason that motor Benzole is added to petrol to make a mixture which has anti-knock qualities.

As a fuel for aviation purposes, motor Benzole is becoming increasingly popular, and for some time has been appreciated by the Air Ministry and has been used by the R.A.F. for many years. The steady growth of civil aviation is opening up yet another channel, down which many gallons of Benzole will flow, and to those who have the interests of our home-produced fuel at heart it will be gratifying to know that motor Benzole is being so widely esteemed in this market, as well as on the road.

Although it is apparent that the study of motor spirit embraces many technical explanations, the National Benzole Company has endeavoured in its literature to explain in an interesting and non-technical manner the virtues of the product in which it is particularly interested. Any of our readers who are interested can obtain literature by application to the company's head office, which is Wellington House, Buckingham Gate, London, S.W.1.

AERODROME LIGHTING EQUIPMENT NEON BEACONS

A PROPERLY - EQUIPPED aerial route comprises a chain of aerodromes and emergency landing grounds, and for night flying the mean distribution of the landing ground should be approximately one field at every 50 kilometres. To obtain an effective luminous signalisation it is necessary that the aerodromes and emergency grounds be indicated, the limits of the fields clearly defined, obstacles marked, the direction of the wind indicated as well as the possibilities for landing, the landing zone illuminated, and, finally, the route marked by beacons. One of the best means for the necessary illumination is the Neon light. It possesses the immense advantage of not being in the least dazzling, and its characteristic red-orange colour distinguishes it clearly from all other luminous objects.

Owing to its abundant emission of red rays the Neon light is specially suitable for signalling at a great distance even in foggy weather. It is well-known that the greater the wavelength the further the radiation carries. The light emitted by Neon is very rich in red rays and poor in rays of shorter wave-length.

The electric energy at its disposal is, therefore, transformed almost entirely into red rays.

It is evident that with a given amount of energy the carrying power obtained will be much greater than if the energy were transformed into rays of all lengths (white light), which are rapidly deadened by aqueous vapour (fog). The sun gives an example: when its disc has almost entirely disappeared below the horizon the red rays of the spectrum are the last to reach us. In diurnal fog only the red rays pass through the screen of aqueous vapour with which the atmosphere is charged, and the sun appears to us to be only a red disc, which one can look at without being dazzled.

Neon signals keep their maximum efficiency day and night, and are specially suitable for Morse code signals, as the illumination and the



The Mur-Ray, Neon Beacon at Evere Aerodrome, Brussels.

extinction of the Neon is instantaneous. For lighting up aerodromes and air routes Neon has given the most practical results in visibility.

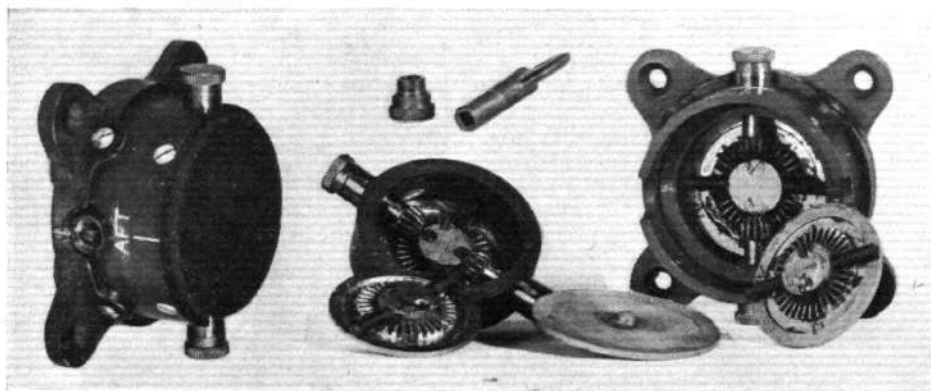
As regards the nature of the Neon lighting equipment, a Neon tube consists of a transparent tube of white glass, at the ends of which metal electrodes are fitted and between which an electric discharge is produced. The tube may be 5 to 45 mm. in diameter and 1½ mm. thick to ensure ample strength, and of varying lengths.

It may be bent back over itself or assume many different forms. In the process of manufacture, after an absolute vacuum has been obtained pure Neon is introduced at a low pressure. Such conditions are essential, as the least trace of any other foreign gas would cause a reduction of the light and heating injurious to the life of the tube. A well-made tube remains practically cold.

Mur-Ray Signs, Ltd., of Harburg Works, Fallowfield, Manchester, are manufacturers of Neon Beacons, and our illustration shows one manufactured and erected by them at Brussels.

THE MICRO-ADJUSTER

ONE of the neatest gadgets we have seen is the Micro-Adjuster which is being marketed by Smiths' Aircraft Instruments, of Great Portland Street, London. Its function is exactly the same as the old corrector box which is mounted beneath the ordinary aircraft compass and which entailed the use of different size loose magnets placed in small holes in its inside. In this new Adjuster the magnetic system is rotatable, and corrections from the smallest to the largest magnitude can be made by simply turning the keys. This method will undoubtedly make compass swinging not only considerably more accurate, but also a very much quicker operation. Our photographs are quite self-explanatory, and from them it is obvious that the key may be inserted from either side, whichever is the easier, of the upper or lower pair of magnets, according to the position of the compass. This micro-adjuster will in future be fitted to most compasses supplied by Smiths without extra charge, but for those who would like to bring their compasses up to date, it is available at 25s. It will be seen that it is very small, being only 2 in. in diameter by 1¼ in. deep and having a total weight of about 6 oz.



The New Micro-Adjuster which Smiths Aircraft Instruments are fitting to their "Husun" Aircraft Compasses. (FLIGHT Photo.)



The Vacuum Oil Co. have recently purchased a Stinson Model "R" (215 H.P. Lycoming engine) which seats 4 persons in great comfort. This aircraft will be used by Mr. J. H. White, in the course of his travels in the Eastern Hemisphere as Aviation representative for the vast vacuum oil interests.

(FLIGHT Photo.)

"CERRIC SYNTHETIC" FINISHES

CELLON, LTD., of Kingston-on-Thames, have found a ready and increasing demand for their new "Cerric" synthetic finishes. We have already made mention of these finishes in FLIGHT, and we were therefore particularly interested to see a recent folder published by the company giving a comprehensive schedule of these lacquers, together with their appropriate primers and fillers. The durability of these finishes is particularly good, and tests have proved that the film outlasts that of the highest grade paint or enamel, and moreover, when applied to metal, is far more resistant to corrosion. They can be supplied either for stoving or of the air-drying type, and for application by spray or brush. The type S.A. 595, which is an air-drying finish suitable for wood or metal and for application by spray or brush, dries reasonably hard in about four hours and is quite hard overnight. This type of finish has already been widely used for three-ply covered wings and fuselages, and gives a really high-class coachwork finish of the type which is proving such a good selling point in new aircraft. An example of a type of finish which is proving very popular is that bronze effect people have been admiring so much on Mr. Nigel Norman's "Puss Moth" at Heston. Bronze effects like this can be obtained in a wide range of colours, and certainly give an aircraft a very distinctive look. The presence of American aircraft in

this country has caused many people to ask why our aircraft do not have the same glasslike finish to their fabric-covered fuselages as do some of those American machines. The answer is that our people can have such a finish if they like (a) to pay for it, and (b) to carry the extra weight. The increase in weight is really enormous and, for example, a "Puss Moth" treated in this manner might be increased anything up to 50 lb. Doping like this has also proved somewhat detrimental to the fabric, and there is no doubt that for all-round efficiency the usual finish is by far the best.

"POWER" BOAT TENDER

MR. T. O. M. SOPWITH, who, as our readers will know has purchased the late Sir Thomas Lipton's yacht *Shamrock*, has now acquired a *Sea Joker* from the British Power Boat Co., of Hythe, Southampton, as a tender to the *Shamrock*. The *Sea Joker* is a 16-ft. boat driven by an 8/28-h.p. "Power" engine at a speed of 25 m.p.h. It is luxuriously fitted with accommodation for six people, and has an electric starter. During the last few weeks Mr. Hubert Scott Paine, of the British Power Boat Co., has received orders for many speed boats and marine engines from all over the world, chief of which are those from India, Africa and Australia. The special protective treatment which has been evolved by the company for hulls has proved most effective in defeating the attacks of the *Torredos* beetle, the pest which has previously made it very difficult to keep boats seaworthy for any length of time, and their boats are therefore in great demand in the tropics.



THE AIR EXERCISES

THE scheme decided upon by the Air Council for this year's Air Exercises is a comparatively modest one. There will be no sham war in the proper sense of the term between two independent commanders. An "Idea" has been drawn up in which the two imaginary Powers, Northland and Southland, figure as usual, but the scheme is intended principally to afford combined tactical training for units of the Royal Air Force and (to a limited extent) to exercise the members of the Observers' Corps. In fact, the exercises will be tactical rather than strategic. The Air Officers Commanding the Fighting Area and the Wessex Bombing Area will not be given complete liberty in operating their squadrons, but the A.O.C.-in-C. Air Defence of Great Britain (Air Marshal Sir Geoffrey Salmond), will control the operations, and will vary the scheme as circumstances demand. The scheme provides that the exercises shall take place between 18.00 hours on Monday, July 18, and 03.00 hours on Friday, July 22, but if the weather is fine they will be terminated earlier. Operations each day are to take place between 18.00 hours and 09.00 hours next day.

No foreign attachés and no representatives of other Services have been invited to attend, and Press visits to air stations and other points of interest are not taking place.

Northland Air Forces (Strength 12 Squadrons)

The A.O.C. is Air Vice-Marshal F. W. Bowhill, C.M.G., D.S.O. His forces and the aerodromes from which they will operate are as follows:—

Squadrons	Type of Aircraft	Station	Commanding Officers
Fighters			
No. 23 (F) Sqdn.	Bulldog	Kenley	Sqd. Ldr. A. L. Paxton, D.F.C.
No. 32 (F) "	Bulldog	Kenley	Sqd. Ldr. B. E. Baker, D.S.O., M.C., A.F.C.
No. 25 (F) "	Fury	Kenley	Sqd. Ldr. W. E. G. Bryant, M.B.E.
No. 1 (F) "	Fury	Northolt	Sqd. Ldr. C. B. S. Spackman, D.F.C.
No. 19 (F) "	Bulldog	Northolt	Sqd. Ldr. A. C. Sanderson, D.F.C.
No. 41 (F) "	Bulldog	Northolt	Sqd. Ldr. S. F. Vincent, A.F.C.
No. 3 (F) "	Bulldog	Upavon	Sqd. Ldr. C. A. Stevens, M.C.
No. 54 (F) "	Bulldog	Upavon	Sqd. Ldr. S. L. G. Pope, D.F.C., A.F.C.
No. 111 (F) "	Bulldog	Upavon	Sqd. Ldr. E. R. Openshaw.
No. 29 (F) "	Siskin	Upper Heyford	Sqd. Ldr. H. D. O'Neill, A.F.C.
No. 43 (F) "	Fury	Upper Heyford	Sqd. Ldr. R. H. Hanmer, M.C.
No. 56 (F) "	Siskin	Upper Heyford	Sqd. Ldr. G. E. Wilson.

Southland Air Forces (Strength 14 Squadrons)

The A.O.C. is Air Vice-Marshal Sir Tom I. Webb-Bowen. His forces and the aerodromes from which they will operate are as follows:—

Squadrons	Type of Aircraft	Station	Commanding Officers
Day Bombers			
No. 12 (B) Sqdn.	Hart	Andover	Sqd. Ldr. D. F. Stevenson, D.S.O., M.C.
No. 18 (B) "	Hart	Tangmere	Sqd. Ldr. T. C. Luke, M.C.
No. 33 (B) "	Hart	Tangmere	Sqd. Ldr. R. A. George, M.C.
No. 35 (B) "	Fairey III F	Hawkinge	Sqd. Ldr. H. M. K. Brown.
No. 40 (B) "	Gordon	Hawkinge	Sqd. Ldr. M. L. Taylor, A.F.C.
No. 602 (B) "	Wapiti	Hawkinge	Sqd. Ldr. Marquess of Douglas and Clydesdale, M.P.
No. 603 (B) "	Wapiti	Manston	Sqd. Ldr. H. R. Murray-Philipson
Night Bombers			
No. 7 (B) Sqdn.	Virginia	Worthy Down	Wing Com. A. L. Gregory, M.B.E., M.C.
No. 58 (B) "	Virginia	Worthy Down	Wing Com. L. L. MacLean.
No. 9 (B) "	Virginia	Boscombe Down	Wing Com. F. W. Stent, M.C.
No. 10 (B) "	Hinaiidi	Boscombe Down	Wing Com. P. C. Sherren, M.C.
No. 99 (B) "	Hinaiidi	Andover	Wing Com. H. G. Smart, O.B.E., D.F.C., A.F.C.
No. 502 (B) "	Virginia	Manston	Wing Com. L. T. N. Gould, M.C.
No. 503 (B) "	Hyderabad	Tangmere	Wing Com. H. I. Hanmer, D.F.C.

General Idea

Northland consists of England, less an area comprising Norfolk, Suffolk, Essex, and London. An imaginary range of mountains covers that area which aircraft cannot cross. Wales is a neutral country, whose neutrality must not be violated, and this neutral zone extends to the North of Manchester. No large town in Northland is considered to be a place of military importance, and consequently such places will suffer the minimum of interference with their sleep at nights. Southland is a country to the South of the English coast line. Bomber squadrons must go out to sea before commencing a raid. They must not, however, go beyond gliding distance of the shore. Fighter squadrons must not attack the bombers when out at sea.

Observation Squadron

In order to supplement the means of observation provided on the ground, a composite squadron, comprising Nos. 501 and 504 (Bomber) Squadrons, is being placed under the Northland Air Force Commander. The composite squadron will be located at Filton, and will be under the command of Sqd. Ldr. R. S. Sugden, A.F.C., O.C. No. 501 Squadron. Sqd. Ldr. C. T. Anderson, D.F.C., O.C. No. 504 Squadron, will be second in command.

Flying Regulations and Safety Precautions

(a) *Restriction of Flying.*—Cross-country flying is not to take place during the Air Exercise, except when authorised by Air Officers Commanding as necessary.

Flying over the Mountains.—Flying over the area enclosed between the East Coast of Northland and the line King's Lynn-Staines-Horsham-Tunbridge Wells-Sheerness, including the Valley of the Thames, is forbidden to all aircraft taking part in the Exercises except that Northland aircraft operating from Kenley will take the most direct route to and from the area in which they are ordered to operate.

Aircraft Landing at "Enemy" Aerodromes.—Aircraft are not to land at aerodromes belonging to their opponents for refuelling except in emergency.

Cloud Flying.—Bombing formations will be allowed to make use of clouds, since otherwise their operations would be unrealistic, but to minimise the danger of collision, the following precautions are to be taken:—

(i) Air Officer Commanding, Southland, is to arrange his raids so as to avoid congestion *en route* to and from and over the objectives.

(ii) Fighters may ascend and descend through clouds, but are not to use them for tactical purposes when in contact with bomber formations. They are to exercise special vigilance when in the vicinity of objectives.

Immunity of Southland Aerodromes from Attack.—In view of their false geographical position, Southland aerodromes are to be considered immune from air attack.

Bomber Courses.—All Southland raids are assumed to come from aerodromes located in Southland. Formations carrying out raids will therefore start their attack from south of Southland-Northland frontier.

Height of Operations.—Operations will be confined to an area between 2,000 feet to 16,000 feet above sea level, but this limitation may be modified on instructions by the Directing Staff.

Navigation Lights.—Fighters are to use navigation lights throughout the night exercises. Bombers are to use navigation lights except when crossing a limited area on the inward journey. If, during this period, a bomber without lights sees another aircraft approaching from any direction or at any height which would make a collision possible, the bomber is to switch on its navigation lights. The responsibility of avoiding collision by night therefore rests with the bombers.

Should navigation lights fail at night, the aircraft is to land at the nearest lighted aerodrome and is not to resume flying until the failure has been remedied.

Rules of Combat

(a) When a bomber formation is attacked by fighters by day, the bomber formation will hold its course.

(b) If formations are approaching "head on," the fighters are to give way in sufficient time to prevent the bombers changing course.

(c) If a bomber is attacked by a fighter by night, the

bomber will hold its course. Not more than one fighter is to attack a bomber at the same time.

(d) Under no circumstances is a formation or single aircraft to approach within 100 yards of an opponent.

(e) Fighter aircraft will not at any time attack or continue an engagement against bomber aircraft within three miles of any objective.

Bombing Procedure

(a) A number of points in Northland have been selected as objectives for bomb raids, and camera obscura will be established at these points. These are in the vicinity of Milton, Wantage, Wallingford, Henley-on-Thames, Coventry and Buckingham. Dropping of bombs will be indicated by visual signal.

No aircraft will carry live bombs or ammunition in the air. A proportion of bombers will, however, carry the full war load of dummy bombs.

Intelligence

(a) *Observer Posts.*—A section of the Observer Corps will be in position in part of the operational area between 1800 hours and 2359 hours on July 18, 19 and 20.

This Corps consists of Special Constables who are stationed at various observation posts and are in communication with the operational headquarters. They endeavour to give continuous information regarding the approach of raiders.

(b) *Alternative Intelligence.*—During the periods when the Observer Corps is not functioning, or when over an unmanned zone, bomber aircraft will report their approximate position, height and course by W/T at regular intervals while they are in the operational area. These reports will serve as Southland Intelligence System during the hours that their observers are not at work or where there are no observers.

Meteorological Information

Arrangements have been made for the transmission of periodical weather forecasts covering the area of operations. These forecasts will be issued by the Air Ministry at the following times:—

(a) 16.00 hours—addressed to all stations—period 8 hours.

(b) 19.30 hours—addressed to all stations engaged in night operations—period 9 hours.

(c) 02.30 hours—addressed to all stations engaged in day operations—period 8 hours.

Searchlights and A.A. Units

No searchlights or anti-aircraft units are operating in the Exercises this year.

Progress of the Exercises may be summarised as follows:—

(1)

22.00 Hours, July 18, 1932.—At 6 o'clock this evening, operations commenced, and the first Day Bomber Squadron of Southland crossed the Northland frontier. The weather conditions generally were favourable, although clouds were low and visibility was poor to the east. Up to the present, close raids by Day Bombers had been made on various objectives in Northland. Information received so far indicates that the defence has been generally successful and according to reports received up to the conclusion of the daylight operations, seven combats had taken place between Fighters and Bombers. It is not yet possible to assess the casualties sustained by both sides, as all reports have not yet been received by the Umpire Staff. Attacks by Southland are being continued and the first night bomb-raids have already been reported as approaching the frontier.

22.10 hours, Monday July 18, 1932.—It was stated at the Air Ministry to-night that shortly before the Air Exercises were due to commence, two aircraft of No. 12 (Bomber) Squadron collided in the air in the vicinity of Andover. The pilot and passenger of one aircraft descended safely by parachute near Shipton Bellinger. The other aircraft landed safely on the aerodrome, the two members of the crew being unhurt.

(2)

18.00 hours, July 18, to 12.00 hours, July 19. *Daylight Raids.*—1. Operations commenced at 6 o'clock on Monday evening.

2. Weather conditions generally were favourable, although clouds were low and visibility was poor to the east. During the night the weather

conditions steadily improved, fine weather extending over a large part of the operational area with comparatively small amounts of cloud. In the early morning there was a slight mist at a few places for a brief time.

3. Attacks by Southland Day Bomber Squadrons took place between 6 p.m. and 9 p.m. on Monday evening. Three Hart Squadrons, Nos. 18, 33, and 12, one Fairey IIF No. 35, one Wapiti No. 602 and one Gordon Squadron No. 40, carried out attacks by Squadrons.

4. The Northland frontier was crossed at points between Selsey Bill and Lutworth. The Hart Squadrons then proceeded to attack objectives at Coventry and Buckingham, the Fairey IIF Squadron objectives at Wallingford, the Wapiti Squadron objectives at Wantage, and the Gordon Squadron objectives at Didcot.

5. As information of raiders was received, the Northland Fighter Squadrons were sent up to intercept them. A Bulldog Squadron, No. 54, intercepted the Hart Squadron, No. 12, making for Buckingham, and shot down one bomber, losing one Bulldog itself. One of the Hart Squadrons, No. 18, raiding Coventry, was intercepted on its way back by three Hart fighters who lost one aircraft. The other Hart Squadron, No. 33, raiding Coventry, was not intercepted.

6. The Fairey IIF Squadron, making for Wallingford, was intercepted by a Fury Squadron, No. 25. One Fairey IIF and one Fury were shot down.

7. The Wapiti Squadron, No. 602, was intercepted over its objective at Wantage by a Bulldog Squadron, No. 19, and one Wapiti and one Bulldog were shot down. This Wapiti Squadron was again intercepted by Bulldogs, Demons, and Furies, of 23 and 25 Squadrons, on the return journey. As a result, two more Wapitis were destroyed.

8. Of all the day bomber raids on the 18th, the only one that escaped interception was the Gordon Squadron, which attacked the objective at Didcot without being molested either on the way in or out.

Night Raids.—9. From 10 p.m. on Monday evening, operations by Southland night bombers commenced. These raids were carried out by single aircraft at various time intervals up to 1 a.m. on Tuesday, July 19.

10. Virginias of No. 7 Squadron attacked objectives at Buckingham and Wantage. Aircraft of this Squadron were attacked on their return by Bulldog fighters of 41 Squadron. One Virginia and one Bulldog were shot down.

11. Virginias of No. 58 Squadron attacked objectives at Wantage and Buckingham. Those attacking Wantage were not intercepted, but one of those attacking Buckingham was shot down by fighters of No. 23 Squadron before reaching its objective.

12. Virginias of No. 9 Squadron attacked objectives at Coventry; one was attacked by Siskin fighters and destroyed. One fighter was shot down.

13. Four Hinadis of No. 99 Squadron attacked objectives at Wallingford, and two were attacked by Bulldog fighters of No. 32 Squadron, and Furies of No. 1 Squadron, one Hinadi being shot down before reaching the objective. One Bulldog was shot down.

14. Six Hinadis of No. 10 Squadron attacked objectives at Milton, and one was attacked by a Bulldog patrol of No. 3 Squadron, but without result.

15. Virginias from No. 502 Squadron and Hyderabads from No. 503 Squadron attacked objectives at Henley. Five combats took place with defending Fighters of No. 32 and 41 Squadrons. Two Virginias and two Hyderabads were shot down, together with two Bulldogs. This action greatly reduced the effectiveness of the raid.

16. From 4 a.m. to 8 a.m. to-day, Tuesday, Southland resumed its raids by day bombers. Raids were carried out on objectives at Coventry, Buckingham, Henley, Milton, Wantage, and Wallingford. Several combats with defending fighters occurred.

17. The results of operations up to date show that the defence, in spite of the lack of normal facilities, such as searchlights, A.A. Guns, etc., have scored a considerable measure of success, and that the attackers may expect to meet a determined resistance in future raids.

(3)

18.00 Hours to 22.00 Hours, July 19.—Operations recommenced at 6 p.m. to-day. The weather, which had been improving steadily during the night, continued fine with comparatively little cloud throughout the day, though the visibility was poor in certain areas. Southland Bomber Squadrons carried out seven raids during this period, their objectives being Coventry, Buckingham, Henley, Milton, Wantage and Wallingford. Of these raids four have been intercepted.

(4)

Amplifying Report of Phase 3—04.00 to 08.00 Hours, July 19.—Raid results during this period were as follows:—

(1) *Coventry.*—Nine Harts, No. 33 Squadron endeavoured to bomb objective, but were intercepted on the way by No. 111 (Fighter) Squadron and lost one bomber and destroyed one fighter. Ten Harts, No. 18 Squadron, were intercepted on their way in by No. 111 (Fighter) Squadron, losing one bomber. This Squadron reached its objective, but was intercepted again on return by No. 29 (Fighter) Squadron and lost a second bomber.

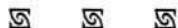
(2) *Buckingham.*—Nine Harts, No. 12 Squadron, successfully reached their objective, but were intercepted on return by No. 43 (Fighter) Squadron, losing two bombers and destroying one fighter.

(3) *Henley.*—Nine Wapitis, No. 603 Squadron, were intercepted on their way in by No. 23 (Fighter) Squadron and were dispersed, losing one bomber and destroying one fighter. They were intercepted again over their objective by No. 1 (Fighter) Squadron, losing two more bombers, and again 13 minutes later, by No. 23 (Fighter) Squadron, when they lost a fourth bomber.

(4) *Milton.*—Ten Fairey IIF's, No. 35 Squadron, were intercepted on their way in by Nos. 1 and 111 (Fighter) Squadrons, losing one bomber and destroying one fighter. They were intercepted again shortly afterwards over their objective by nine Furies, losing two more bombers.

(5) *Wantage.*—Ten Harts, No. 12 Squadron, carried out a successful raid, reaching their objective and returning without being intercepted. Nine Wapitis of No. 602 Squadron were intercepted on their way in by No. 19 (Fighter) Squadron, losing one bomber and destroying one fighter. They were intercepted again a few minutes later by No. 111 (Fighter) Squadron and lost a second bomber. They succeeded, however, in reaching their objective.

(6) *Wallingford.*—Nine Gordons, No. 40 Squadron, were intercepted on their way in by No. 19 (Fighter) Squadron and lost one bomber. They reached their objective, but were intercepted again on their return, by No. 43 (Fighter) Squadron, and lost a second bomber.



Maintenance of Aircraft Tyres

AIR MINISTRY Notice to Ground Engineers No. 31 of 1932 draws attention to the danger of aircraft tyres developing "concussion bursts" which may result in complete failure of the outer cover. It is recommended, therefore, that periodic examination should be made of tyres for indications of the initial stages of failure, the best method being to pass the hand over the tyre, when the affected area can generally be detected by a local



swelling. Careful checking of the correct tyre pressure at frequent intervals is also recommended.

Ground Engineers' Licences, Category X

ACCORDING to Air Ministry Notice to Ground Engineers No. 29 of 1932, examination boards will sit at the Home Aircraft Depot, R.A.F., Henlow Camp, Bedfordshire, on the third Friday in the months of August and February, and examination in the parachute category "X" can only be made at these specified times.

THE ROYAL AIR FORCE

London Gazette, July 12, 1932.

General Duties Branch

The follg. Pilot Officers on probation are confirmed in rank:—J. W. A. Hunnard (June 1); R. K. Brougham (June 13); R. G. M. Apthorp, W. J. F. Bull, E. M. Donaldson, C. D. P. Franklin, H. D. Gilman, L. T. Jearey, N. W. Mackenzie, R. L. McKern, G. A. L. Manton, O. A. Morris, R. R. Murphy, B. S. Nicholl, T. P. Pilcher, P. S. H. Ross, W. J. Smail, J. O. Willis, R. H. Youngusband (June 26).

The follg. Flying Officers are granted permanent commns. in this rank with effect from July 1:—R. W. P. Collings, N. H. Fresson. The follg. Pilot Officers are promoted to rank of Flying Officer:—B. A. Casey, H. W. Marlow (June 5); L. G. Belchem, R. T. Cazalet, H. Eeles, W. F. C. Hobson, T. Q. Horner, R. L. Wilkinson (June 20); F. W. Yates (July 5); J. N. Dufort (July 10).

Pilot Officer on probation J. G. Cardale is confirmed in rank (July 10); Squadron Leader E. B. C. Betts, D.S.C., D.F.C., is restored to full pay from half pay (June 28). The follg. Flying Officers are transferred to Reserve, Class A:—A. C. Pearson, V. S. W. Smyth (July 1).

F/O. P. J. J. Cullinan relinquishes his short service commn. on account of ill-health (July 13); F/O. M. A. Platts relinquishes his short service commn. on completion of service (July 7); the short service commn. of Pilot Officer on probation J. G. Davies is terminated on cessation of duty (July 13).

Medical Branch

J. F. Dales, M.R.C.S., L.R.C.P., is granted a short service commn. as Flying Officer for three years on the active list, with effect from and with seny. of June 27.

Dental Branch

D. I. Malcolmson, L.D.S., is granted a non-permanent commn. as Flying Officer with effect from and with seny. of June 27.

PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE

Staff Nurse Miss D. M. E. Brand is promoted to rank of Sister (June 29).

ROYAL AIR FORCE RESERVE RESERVE OF AIR FORCE OFFICERS

General Duties Branch

The follg. are granted commns. in Class AA (ii) as Pilot Officers on probation (June 27):—B. K. Burnett, N. V. Lindemere. W. Dougall is granted a commn. in Class A as a Flying Officer (April 6); S. P. Jackson is granted a commn. in Class AA (i) as a Pilot Officer on probation (June 22). The follg. Pilot Officers on probation are confirmed in rank:—H. J. Greenland (June 1); C. D. Whittingham (June 2); T. C. Wallace (June 7); G. S. Waller (June 22); C. E. Powell (June 25); C. B. Houlder (June 29); T. P. de Paravicini (June 29); G. E. T. Scrase (June 29). Gazette of Oct. 13, 1931, concerning F/O. G. R. De Havilland, is cancelled.

SPECIAL RESERVE

General Duties Branch

H. C. Raphael is granted a commn. as Pilot Officer on probation (June 8).

AUXILIARY AIR FORCE

General Duties Branch

No. 603 (CITY OF EDINBURGH) (BOMBER) SQUADRON.—P/O. E. H. Steven is promoted to rank of Flying Officer (July 7).

Medical Branch

No. 604 (COUNTY OF MIDDLESEX) (BOMBER) SQUADRON.—F/O. A. T. G. Thomas, M.B., B.S., is promoted to rank of Flight Lieutenant (July 7).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified.

General Duties Branch

Wing Commander R. C. Hardstaff, to School of Tech. Training (Men), Manston, 5.7.32, for Engineer duties vice W./Cdr. G. H. P. Padley.

Squadron Leaders: E. C. Emmett, M.C., D.F.C., to Marine Aircraft Experimental Estb., Felixstowe, 5.7.32, for Administrative duties vice W./Cdr. E. D. Johnson, A.F.C. T. C. Thomson, to No. 58 (B) Sqdn., Worthy Down, 10.7.32, for flying duties. F. H. Laurence, M.C., to R.A.F. Depot, Uxbridge, 7.7.32, whilst attached to the office of the Judge Advocate General.

Flight Lieutenants:—S. N. Webster, A.F.C., to H.Q., Wessex Bombing Area, Andover, 5.7.32. F. W. Foster, D.F.C., D.S.M., to H.M.S. *Courageous*, 30.6.32. T. H. Downes to Aircraft Park, Lahore, India, 15.6.32. B. C. Yarde, to Aircraft Depot, Hinaidi, Iraq, 10.6.32, instead of as previously notified on June 18, 1932. C. P. O. Bartlett, D.S.C., to No. 2 (A.C.) Sqdn., Manston, 7.7.32. C. F. Steventon, to R.A.F. Depot, Uxbridge, 11.7.32. F. S. Hodder, to R.A.F. Base, Calshot, 11.7.32.

Flying Officers: L. A. Hutchings, to No. 2 (A.C.) Sqdn., Manston, 4.7.32. D. C. T. Bennett, to R.A.F. Base, Calshot, 3.7.32. F. Crump, to R.A.F. Base,

Calshot, 3.7.32. E. D. A. Bigg, to R.A.F. Base, Calshot, 3.7.32. C. V. J. Pratt, to Air Armament School, Eastchurch, 6.7.32. W. R. Beaman to Central Flying School, Wittering, 25.9.32. D. J. Eayrs, to Central Flying School, Wittering, 18.9.32. C. R. Davies, to Home Communication Flight, Hendon, 1.7.32. T. J. Rees, to Station H.Q., Mount Batten, 11.7.32. G. K. Horner, to Administrative Wing, Halton, 9.7.32. N. C. Walker, to No. 13 (A.C.) Sqdn., Netheravon, 11.7.32.

Pilot Officers: J. W. Burgess, to R.A.F. Base, Calshot, 3.7.32. G. L. Menzies, to R.A.F. Base, Calshot, 3.7.32. A. M. Carey, to R.A.F. Base, Calshot, 3.7.32. L. F. J. Taylor, to R.A.F. Base, Calshot, 3.7.32.

Stores Branch

Flight Lieutenant L. V. Hirst, to H.Q., Wessex Bombing Area, Andover, 11.7.32.

Accountant Branch

Squadron Leader C. W. Rogers, to Aeroplane and Armament Experimental Estab., Martlesham Heath, 5.7.32, for Accountant duties.



The Royal Air Force Memorial Fund

The third Meeting of the Council of the above Fund was held on July 6. There was a very large attendance of Members, Sir Charles McLeod, Bart., being in the Chair, and he was supported by the Deputy Chairman, Dame Helen Gwynne-Vaughan, G.B.E., and eleven other members, including Air Marshal Sir Edward Ellington, K.C.B., who is Air Member for Personnel on the Air Council.

After the usual financial resolutions had been carried, the Council proceeded to discuss the matter of the Government scheme for conversion of the 5 per cent. War Loan and without any hesitation they unanimously agreed that all the holdings of the Fund in this particular War Loan should be at once converted to the 3½ per cent. Loan, although this means a not inconsiderable decrease for 1933 and onwards of the annual interest derived from the old 5 per cent. War Loan. This resolution is subject to the consent of the Trustees of the Fund, namely, Lord Weir of Eastwood, Lord Trenchard of Wolfeton, and Lord Hugh Cecil.

The usual report concerning the distribution of relief amongst past and present members of the Force was read to the Meeting, and the number of cases in which relief has been given since the last Meeting of the Council on May 18 was 218 cases and post-war cases, and the amount of grants sanctioned in the period named was £1,268 18s. 5d.

The Council was represented by the Secretary of the Fund at the Annual Meetings of two kindred societies, both of whom render the Council very great help, namely, the S.S. & A.F.A., whose meeting took place at the Basil Street Hotel on July 8, and the S.S. & A.H.S., whose meeting took place at the Caxton Hall on July 1, at which meeting H.R.H. the Duke of Connaught was in the Chair.

R.A.F. Apprentice Clerks

The Air Ministry announces:—Vacancies exist in the Royal Air Force for well-educated boys, between the ages of 15½ and 17, to enter as apprentice clerks in October and January next. The appointments will be made partly by the direct entry of boys who have obtained an approved school certificate, and partly by means of open competitions which will be held by the Civil Service Commission in October at various centres.* Applications in respect of the October examinations should be made to the Civil Service Commission not later than September 1.

Detailed information regarding the apprentice clerk scheme can be obtained from the Secretary, Air Ministry (Apprentice Clerks' Department), Gwydyr House, Whitehall, S.W.1. Successful candidates will be required to complete, in addition to the training period, 12 years' Regular Air Force service after reaching the age of 18. At the age of 30 they return to civil life, but a proportion of those attaining non-commissioned officer rank may, subject to Service requirements, be permitted to re-engage to complete time for pension.

Boys entered under this scheme undergo a two years' course of training in clerical duties, typewriting, shorthand, book-keeping and practical office

routine, during which time their general education is continued under a staff of graduate teachers.

The apprentice clerks are at present paid 1s. a day for the first year and 1s.6d. a day afterwards. The subsequent commencing rates of pay, at present varying from 3s. to 4s. 6d. a day (21s. to 31s. 6d. a week), depend upon the degree of success they achieve at their final examination. In addition, they receive free board and lodging and a uniform allowance.

* The Open Competition is conducted by the Civil Service Commissioners at the following centres:—

London, Belfast, Edinburgh, Plymouth, Birmingham, Chatham, Cardiff, Portsmouth, Manchester, Newcastle-on-Tyne.

R.A.F. Stores Officers

The Air Ministry announces that about 5 vacancies for permanent commissions in the Stores Branch of the Royal Air Force will be offered for competition among young men who have attained the age of 23 and have not attained the age of 25 on January 1 next following the entrance examination (see paragraph 2). No extension of these age limits can be allowed in any circumstances. Candidates must have had not less than five years' business experience in a firm of standing. This will be the seventh competition under the scheme inaugurated in 1926 for the purpose of obtaining men with a business training to control and administer the supply of the highly valuable and complex equipment of the Royal Air Force.

From among those who apply a limited number of candidates will be selected to proceed to the examination, which will be held in London in the latter part of October, 1932, and will consist of two parts, an interview before a board and a written examination. The written examination will be of such a character that men of good general education can take it without special study.

Accepted candidates will be gazetted to commissions as Pilot Officers on probation and will receive six months' training in their future duties. After a year's satisfactory service they will be eligible for confirmation in their appointments and for promotion to the rank of Flying Officer. Promotion above the rank of Flying Officer will be by selection, subject to passing a qualifying examination.

The emoluments of officers in the Stores Branch, including the value of quarters, rations, and services in kind, or cash allowances in lieu, range at present from approximately £330 a year for an unmarried Pilot Officer and £360 a year for a Flying Officer on promotion, to £1,120 a year for a married Group Captain (the highest rank for which provision is made). The expenses in Royal Air Force messes are strictly regulated so that officers even of the most junior rank can live upon their pay.

Application should be made to the Secretary, Air Ministry (S.7), Kingsway, London, W.C.2, for the regulations and for application forms. Completed application forms should reach the Air Ministry by August 15 next, or at the latest by September 1.

CORRESPONDENCE

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

ENGINE MOUNTING STRESSES

[2797] Whilst I can readily follow Mr. Roger's explanation of the method by which he has obtained the thrust and gravity components referred to in the issue of FLIGHT for July 1, I can see no justification for his assumptions (1) that the whole of the aft gravity component is carried at A and a, and (2) that the only thrust components carried by B and C are those due to a moment of the thrust load about a line Aa.

Norwich.

J. F. Cuss.

July 4, 1932.

FAST FLIGHT FROM IRELAND

[2798] I notice in your issue of July 1, under the heading "From Heston," that a quick-time flight was made from Finglas to Heston in 2 hours 32 minutes.

Whilst fully appreciating that this flight was accomplished in very good time, I should like to draw your attention to the three flights made by Hillman's Airways on Sunday last, June 26. The flights carried out were as under:—

1. Baldonnel to Heston, by Capt. E. D. Crundall, D.F.C., in "Puss Moth" G-ABSB. Time, 2 hours 30 minutes.
2. Finglas to Croydon, by Mr. T. W. Morton, in "Puss Moth" G-ABVX. Time, 2 hours 42 minutes.
3. Baldonnel to Stag Lane via Barton (where a landing was made), by Mr. V. E. Flowerday, in "Puss Moth" G-ABSO. Time, 3 hours.

H. Wood,

Chief Pilot,

Hillman's Airways.

Romford Aerodrome, Essex.

July 2, 1932.

PUBLIC ATTENDANCE AT THE KING'S CUP

[2799] I was much disappointed at the public attendance for the start of the King's Cup race this year.

My wife and I were apparently the only two members of the general public who attended, and we were sorry to see such lack of enthusiasm, due, we feel, to the fact that the race was not enough advertised.

Last year, at an earlier hour, there seemed to be much more attendance. Perhaps "the rabbits on the ground" are not out at dawn as formerly!

Anyhow, "the public" had the pleasure of seeing the winner of the Siddeley Cup both start and finish, and supported their club.

JOSE PEASE.

Richmond, Yorks.

July 15, 1932.

Aeromodellists' Rally at Shoreham

A GRAND RALLY of Aeromodellists will be held on Shoreham Aerodrome on Sunday afternoon, July 24, at the invitation of the 9th Wing, the Model Aircraft Club (T.M.A.C.).

Air Mail Profits

THE Postmaster-General, replying to questions in the House on July 4, stated that the profits on air mail services in 1930-31 amounted to about £1,000, and that the charges for Imperial mails are fixed at so low a figure that the profits were quite inadequate to afford an indirect subsidy for the encouragement of new air lines.

Savings on Air Expenditure

THE Under Secretary of State for Air stated in the House on July 12 that the original recommendations of the May Committee covered specific savings on air expenditure (exclusive of research and inspection) of £299,000. The actual savings, partly permanent and partly non-recurrent, ultimately effected under all heads of 1932 Air Estimates (including research and inspection) amounted to approximately £900,000. In addition, £50,000 was saved on expenditure on air services borne on the Colonial and Middle East Votes, making a grand total of £950,000 savings.

R.A.F. Night Flying

THE Under Secretary of State for Air was asked on July 12 what action he proposed to take about complaints of night flying in the neighbourhood of Hornchurch Aero-

drome. Sir Philip Sassoon replied that the night-flying exercises were essential if the defence of London was to be efficient, and the Air Minister felt justified in the public interests in asking for the forbearance of the community for the limited period of the exercises.

High Masts in Somerset

AIR MINISTRY Notice to Airmen (Special), Series A, No. 39, of 1932, is a notification that radio masts approximately 500 ft. high are being erected at Washford Cross, 1½ miles S. by W. of Watchet, in North Somerset.

Ignition of Holt Flares

AN Air Ministry Notice to Ground Engineers, No. 26, of 1932, warns owners of aircraft and proprietors of civil aerodromes to ensure that the leads of Holt flares fitted to any aircraft should be disconnected before the aircraft are placed in a hangar. This notice has become necessary owing to the increasing use of night landing installations on private aircraft and owing to the possibility of accidental ignition of these flares.

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IMPORTS AND EXPORTS

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910).

For 1910 and 1911 figures see FLIGHT for January 25, 1912.

For 1912 and 1913, see FLIGHT for January 17, 1914.

For 1914, see FLIGHT for January 15, 1915, and so on yearly, the figures for 1930 being given in FLIGHT, January 16, 1931.

	Imports.		Exports.		Re-exports.	
	1931.	1932.	1931.	1932.	1931.	1932.
	£	£	£	£	£	£
Jan. ...	7,965	2,456	142,596	122,942	1,074	863
Feb. ...	3,303	2,503	110,587	181,482	1,293	90
Mar. ...	5,615	1,946	83,088	167,195	3,441	200
April ...	2,216	622	213,401	142,145	530	1,128
May ...	1,964	1,747	275,382	138,356	108	5
June ...	6,780	398	78,298	126,330	361	125
	27,843	9,672	903,352	878,450	6,897	2,411

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PUBLICATIONS RECEIVED

Bibliography of Aeronautics, 1930. By P. Brockett. U.S. National Advisory Committee for Aeronautics. Superintendent of Documents, Washington, D.C., U.S.A. Price 50 cents.

U.S. National Advisory Committee for Aeronautics Reports: No. 408. General Formulas and Charts for the Calculation of Airplane Performance. By W. B. Oswald. Price 25 cents. No. 411. Theory of Wing Sections of Arbitrary Shape. By T. Theodorsen. Price 10 cents. No. 414. The Effect on Airplane Performance of the Factors That Must be Considered by Applying Low-Drag Cowling to Radial Engines. By W. H. McAvoy, O. W. Schey and A. W. Young. Price 20 cents. No. 417. Pressure Distribution Tests on a Series of Clark Y Biplane Cellules with Special Reference to Stability. By R. W. Noyes. No. 418. Preliminary Investigation of Modifications to Conventional Airplanes to give Nonstalling and Short-Landing Characteristics. By F. E. Weick. Price 5 cents. Superintendent of Documents, Washington, D. C., U.S.A.

Sidstrand III Aeroplane. Air Publication 1381. London: H.M. Stationery Office, W.C.2. Price 3s. 6d. net.

Catalogue

Telcon Metals: Induction Melted Electric Resistance Alloys. Wild-Barfield Electric Furnaces, Ltd., Elecfurn Works, North Road, Holloway, London, N.7

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NEW COMPANY REGISTERED

LUXURY AIR TOURS LIMITED, 56, Fleet Street, E.C. Capital £100 in £1 shares. Manufacturers and letters on hire of and dealers in aeroplanes, seaplanes and aircraft of all kinds, etc. Directors: Mildred M. Bruce, The Woodbines, West End, Esher, Surrey. V. A. Bruce, address not stated. J. B. W. Pugh, A.F.C., The Moorings, Hammer Vale, Haslemere, Surrey. Secretary: C. F. Glover.

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AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. (The numbers in brackets are those under which the Specification will be printed and abridged, etc.).

APPLIED FOR IN 1931

Published July 21, 1932.

- 5,151. F. ROSLER, Jn. Screw and like propellers. (370,302.)
- 11,467. AERODYNAMIQUE INDUSTRIELLE. Wind shields. (375,471.)
- 13,286. H. M. RIIS. Screw propeller. (375,488.)
- 13,437. H. M. RIIS. Screw propeller. (375,489.)
- 15,977. J. F. G. M. L. CHARPENTIER. Tailless aeroplane constituted by a three-element wing. (375,515.)
- 16,848. J. K. CROWE. Aeroplanes. (375,530.)
- 18,255. SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT, LTD., and H. N. WYLIE. Floats for aircraft. (375,548.)
- 19,536. ECLIPSE AVIATION CORPORATION. Variable-pitch propeller. (375,561.)
- 29,271. IRVING AIR CHUTE CO. Parachute rip-cord apparatus. (375,661.)
- 28,902. SIEMENS & HALSKE AKT.-GES. Exhaust manifolds for two-stroke radial engines. (275,668.)
- 33,566. SCHNEIDER ET CIE. Artillery gun for firing against aircraft. (375,693.)